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Macs to play peer role in NetWare nets

By Caryn Gillooly
Senior Editor

SAN JOSE, Calif. — Novell, Inc. is working on technology that will give Apple Computer, Inc. Macintoshes more NetWare connectivity options, including peer links to other net resources.

According to Novell executives, the company has released a set of application program interfaces (API) called Mac IPX to 25 developers for alpha testing. The APIs will enable developers to build applications that let Macintoshes on a NetWare local-area network communicate in a peer fashion with DOS, OS/2, other Macintosh clients or even servers using Novell's Internetwork Packet Exchange (IPX) protocol.

Currently, Macintosh clients can only communicate with NetWare-based resources using AppleTalk or the Transmission Control Protocol/Internet Protocol. This means that if a Macintosh client wants to talk directly to another NetWare client, the DOS or OS/2 machine would need either an AppleTalk or TCP/IP protocol stack locally installed.

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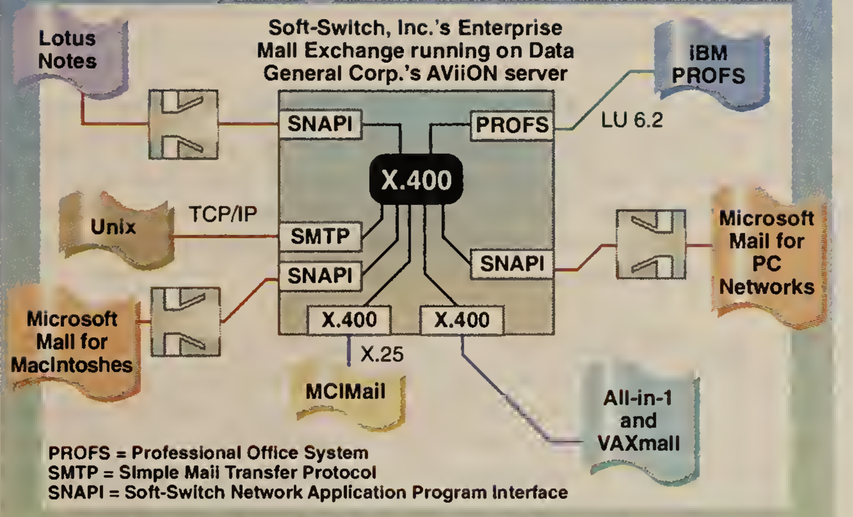
J.P. Morgan's global E-mail architecture


Lotus Notes
Soft-Switch, Inc.'s Enterprise Mail Exchange running on Data General Corp.'s AViiON server
IBM PROFS
SNAPI
PROFS
LU 6.2
X.400
Unix
TCP/IP
SMTP
SNAPI
SNAPI
Microsoft Mail for PC Networks
Microsoft Mail for Macintoshes
X.400
X.400
X.25
MCIMail
All-in-1 and VAXmail

PROFS = Professional Office System
SMTP = Simple Mail Transfer Protocol
SNAPI = Soft-Switch Network Application Program Interface

J.P. Morgan is replacing a series of E-mail gateways with a centralized hub architecture to interconnect disparate mail systems across the firm's global multiprotocol internetwork.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: J.P. MORGAN & COMPANY, INC., NEW YORK

J.P. Morgan takes simpler approach to E-mail unity

By Wayne Eckerson
Senior Editor

NEW YORK — J.P Morgan & Company, Inc. is migrating its global E-mail network to an X.400 hub-based architecture that will enhance intracompany communications while easing E-mail management and support requirements.

The financial services firm, based here, uses gateways to interconnect some of the seven types of electronic mail systems serving 14,000 employees in about two dozen offices in the U.S., Europe and the Far East.

"When we realized we would eventually need 49 gateways to interconnect our E-mail systems, we knew there was a better way," said Penny McLoughlin, manager of global messaging and E-mail integration at J.P. Morgan. "You reach a point at which [supporting multiple gateways] becomes a management nightmare."

To ease the support work load while increasing E-mail connec-

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NSF changes course on its Internet plan

Targets 155M net primarily for supercomputers, leaves door open for expanded commercial use.

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — The National Science Foundation (NSF) last week laid out a plan that promises to change the face of the Internet, fostering more commercial use and private-sector provisioning of services.

The NSF said its plans for a federally funded 155M bit/sec Internet backbone have been changed to focus on linking four supercomputer centers, leaving regional Internet networks free to forge their own high-speed connections.

At an as yet undetermined date, NSF will no longer subsidize a single general-purpose high-speed backbone to support the regional nets that constitute the Internet. Instead, the mid-level networks will be free to use NSF-allocated funds to forge links between one another by whatever means they choose, a plan that met with widespread approval on all fronts.

The NSF change of course — which will be detailed this February when the final solicitation for the NSF Network (NSFNET) upgrade is released — is expected to strengthen connections between the regional providers and contribute to private-sector provisioning of commercial Internet

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NEWSPAPER

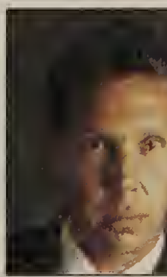
Oracle RPC tool will support distributed applications

By Timothy O'Brien
West Coast Bureau Chief

REDWOOD SHORES, Calif. — Oracle Corp. early next year will introduce a multiplatform remote procedure call (RPC) facility that will allow users to create distributed applications in a heterogeneous network environment.

While full details are not yet available, the RPC facility is expected to include a precompiler that will help developers generate local and remote — or client and server — software components that can be embedded into applications to facilitate distributed processing.

In an interview with *Network World,* Oracle Chairman Lawrence Ellison said users can expect Oracle to offer soon "a portable RPC that automatically works from any computer to any computer in the network." He said Oracle will base its RPC facility on an unbundled version of its SQL*Net software, which has been provided only as a component of its database.


Ellison

"We have some very interesting underlying technology, and we are likely to unbundle [SQL*Net] and make it generally

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New features to shore up IBM's APPN

By Michael Cooney
Senior Editor

RALEIGH, N.C. — IBM plans to add features to its Advanced Peer-to-Peer Networking (APPN) architecture in the next 12 to 18 months that will make it faster and more dynamic, eliminating the two most nagging problems with the emerging technology.

The features, known as Automatic Network Routing (ANR) and Rapid Transport Protocol (RTP), will enable the architecture to dynamically route data around network failures and provide a three- to tenfold net performance improvement.

The inability to route around

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Blue Cross and suppliers team up to stem toll fraud

AT&T, MCI and Account-A-Call working together in unique partnership to protect health care firm.

By Bob Wallace
Senior Editor

CHICAGO — In a first-of-its-kind arrangement, Blue Cross and Blue Shield has teamed with two long-distance carriers and a software company to develop a system that will help its offices across the country detect and respond to toll fraud.

Under the plan revealed last week, AT&T and MCI Communications Corp. will feed Blue Cross' call detail records to Account-A-Call Corp. (ACC), which will review them for toll fraud. ACC will prepare reports alerting Blue Cross to possible hacking.

The health insurance firm said this approach to identifying toll fraud is simpler and far less expensive than buying and operating its own call accounting hardware and software.

The arrangement is an interim step until the carriers can provide suspicious call detail records electronically to Blue Cross on a daily basis, which would help the company spot fraud even faster. AT&T has already committed to doing that by year-end 1993.

Everyone involved agreed that the current arrangement could serve as a model for other users

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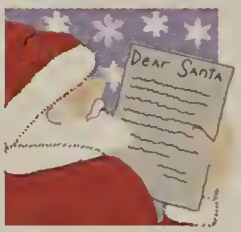
Users' 1992 Christmas list filled with repeat wishes

Open systems, better net mgmt. top requests.

By Skip MacAskill
Staff Writer



The Ghost of Christmas Past seems to have visited most users in 1992, as integrated network management, nonproprietary solutions and standards-based products once again rank high on users' Christmas wish lists this year.

George Shannon, an operations analyst at Jewish Hospital in St. Louis, is asking for shared databases across different networks and products that are easy to use and nonproprietary.

"If I could, I would ask for a 100M+ bit/sec network with protocol-independent applications and an architecture that's easy to use," he said. "I want to be able to set it up easily and not have to hire someone with a master's degree in computer science and a double E to get it to run."

C.J. Combs, an analyst at Pacific Bell, had a similar request for network management. "I would like the fully integrated net management product that everybody says they

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Carriers form consortium to revamp messaging plan

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — Seven value-added network providers last week formed a consortium to support a proposed X.400 addressing scheme that will allow users to change carriers without having to change their mail addresses.

The members of the consortium, called the U.S. National Message Transfer Service Implementors' Group (US-NMTS Group), have agreed to work out a modified message routing plan that will support X.400 number portability. The consortium will also work to create links between members' networks that allow users to employ more than one carrier, providing a new level of redundancy in X.400 messaging.

The effort essentially entails removing the routing information contained in the user's X.400 address that identifies the user's carrier, said Durwin Sharp, electronic mail advisor with Exxon Computing Services, Inc., an Exxon Corp. subsidiary. That information would be made available elsewhere for routing purposes, making X.400 messaging as easy as placing a phone call.

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Briefs

Time's running out. Entries for the International Communications Association (ICA)/*Network World* Call for Innovation program must be submitted by Dec. 31. Through Call for Innovation, ICA and *Network World* recognize network professionals within the user and academic communities for their creative application of network technology to solve problems and create new business opportunities. Winners will be honored at a special ceremony at the ICA ComNet Dallas '93 conference in May. For more information, call *Network World* Editor John Gallant at (508) 875-6400.

Banyan, Novell join hands. Banyan Systems, Inc. last week announced it has become a member of Novell, Inc.'s Technical Support Alliance, while Novell simultaneously announced it has become a member of Banyan's Strategic Support Alliance. Customers will now be able to call Banyan or Novell to resolve network problems concerning either company's products.

More on DEChub 900. Details continue to emerge on Digital Equipment Corp.'s forthcoming DEChub 900, the company's next-generation hub, which is expected in the spring. DEChub 900 will feature a 2G bit/sec MultiSwitch bus that can be configured as a traditional bus, a ring-based backplane or a cell-switching backplane for Asynchronous Transfer Mode networking, DEC officials said.

Teleport turns on more cable TV firms. Teleport Communications Group, Inc., which operates a string of alternative access carriers, last week announced that cable television operators Continental Cablevision, Inc. and Comcast Corp. have each purchased 20% stakes in Teleport. Current owners Cox Enterprises, Inc. and Tele-Communications, Inc. will each end up with 30% shares of the company.

Bell Atlantic tests cable waters. Bell Atlantic Corp. last week announced plans to enter the cable television business by partnering with FutureVision of America Corp. in Downington, Pa. Bell Atlantic's New Jersey Bell Telephone Co. subsidiary will provide video dial tones to 38,000 homes in Dover Township, N.J., enabling FutureVision to offer 60 channels of programming.

Separately, Bell Atlantic last week filed suit against the Federal Communications Commission calling for the commission to overturn part of the 1984 Cable Act that bans local phone companies from offering CATV service in their regions.

DCA to buy Avatar. Digital Communications Associates, Inc. last week announced plans to buy Avatar Technologies Corp., a maker of Macintosh-to-mainframe software and hardware. DCA and Avatar expect the $8 million transaction to be completed by year end. DCA intends to restructure Avatar, integrate Avatar's operations into its own and close Avatar's Hopkinton, Mass., and Santa Clara, Calif., facilities.

Motorola to invest in Racotek. Motorola, Inc. is expected to announce shortly after the new year an equity investment in Racotek, Inc., a privately held company in Minneapolis that provides mobile voice and data network services. Separately, a Motorola spokeswoman said the company plans to make an announcement this week regarding funding for Motorola's ambitious Iridium satellite cellular phone network. Motorola initially set a target of Dec. 15 to sign 15 to 20 investors for Iridium, which was announced two years ago.

CONTACTS

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Council backs tough outage reporting requirements

Lowers reporting threshold for downed lines.

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — The Network Reliability Council last week endorsed stronger outage reporting requirements, lowering the threshold at which carriers are required to report network outages from 50,000 to 30,000 downed lines.

The council, a group of service providers and users that advise the Federal Communications Commission on reliability issues, also said it will release in January a draft document outlining how carriers, equipment vendors, users and regulators should work together during major outages.

But council members made it clear they prefer an informal, voluntary approach to disaster backup and have no plans to enter into a formal mutual aid agreement such as that in New York ("Protecting the net: user-led effort pays off for NYC," *NW*, Aug. 17).

Meeting at the FCC here, the council unanimously approved a resolution under which its members, which comprise the major local exchange, long-distance and alternate providers, will report to the FCC all outages affecting 30,000 lines or more.

The previous reporting threshold was defined as 50,000 or more lines going down for 30 minutes or more, and carriers were required to report such incidents within 90 minutes.

Under the new plan, outages of 30,000 to 50,000 lines would have to be reported within three days, while outages of more than 50,000 lines would be reported in 90 minutes.

Carriers also voted to report outages without benefit of confidentiality, an issue that had been a concern in the highly competitive long-distance industry. Since the data would be made public, carriers worried that would put them at a disadvantage.

These reporting requirements would extend for the next six months, at which time the council will revisit the topic.

In January, the council plans to release the Mutual Aid and Restoration Compendium, a first-draft collection of formal and informal agreements describing how carriers, equipment makers, users and regulators can cooperate to restore service during disruptions.

Mick McCarthy, senior vice-president of networks at Sprint Corp., urged council members to put in place the kind of informal, prearranged disaster recovery plan that proved beneficial for Sprint last October during a flood in Fairfax, S.C.

When Sprint's switch was flooded, the carrier had BellSouth Corp. hand off Sprint traffic to AT&T and worked with dozens of equipment vendors to bring service back. McCarthy said the restoration went smoothly since Sprint had earlier conducted a "paper drill" of its plans.

However, council members voiced opposition to formal arrangements, such as the network sharing agreement pressed upon them by New York, the first city in the U.S. to force carriers to work together for the sake of users, particularly the city's large financial industry.

"We don't want too many lawyers with too many agreements," said Bert Roberts, chairman of MCI Communications Corp. "It would slow restoration down."

PBX interoperability spec nears int'l standard status

By Bob Wallace
Senior Editor

PARIS — A fast-emerging private branch exchange interoperability standard promises to let users mix and match switches in their private global Integrated Services Digital Networks.

Ten PBX vendors, accounting for most of the world's PBX production, are pressing the International Standards Organization to approve the specification, dubbed Q.Sig, as a common way to implement the ISDN Q.931 signaling protocol for use with the ISDN Primary Rate Interface in private PBX nets.

Q.Sig will for the first time enable multinational firms to support a common and fairly robust set of calling features across global ISDN nets comprising switches from multiple vendors.

Vendors today implement Q.931 differently, meaning switches from one will not necessarily work with another. "Every PBX vendor has a slightly different, nonstandard way of implementing the protocol," said Bill McMichael, Northern Telecom Inc.'s Meridian 1 product manager for network services.

The vendors backing the effort — which is being heralded as a watershed event in the evolution of ISDN — include Alacatel N.V., Ascom Timeplex, Inc., Ericsson Corp., GPT, Ltd., Matra, S.A., Northern Telecom, Philips Industries, N.V. and Siemens AG.

Notable in its absence is AT&T, which said it is a member of other standards-developing groups but would not say why it has not joined the Q.Sig effort.

The imminent approval of Q.Sig by the ISO has excited the 10 switch makers that have been working on the specification for many years.

"This specification has been in the works since the mid-1980s and is finally ready to become an international standard," said Anthony Tissot, group manager for systems management and networks at Rolm, an IBM and Siemens company. "We fully expect Q.Sig to work wonders for private, international ISDN networks."

Larry Minzey, U.S. product manager for Ericsson's MD-110

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Cabletron to use chip for new security

By Skip MacAskill
Staff Writer

ROCHESTER, N.H. — Cabletron Systems, Inc. is prepping an enhanced security feature for its intelligent hub line that will allow net administrators to quadruple the number of net addresses that can be secured.

Scheduled for availability in mid- to late 1993, the enhanced Hub Locking capability is based on a new data scrambling chip that will be available on four of the company's network interface modules for its Multi Media Access Center hub.

"The enhancements will allow the user to support more users per port and provide better security with scrambling," said David Cullerot, Ethernet product manager at Cabletron.

Previously, the company was only able to secure one address per port on the EMME, TPR, CXR and FOR Media Interface Modules. The EMME was equipped with National Semiconductor Corp.'s Systems Oriented Network Interface Controller chip, while the other three modules used the Repeater Interface Controller chip.

The new chip, which will be available on all four modules, can maintain as many as 52 secure addresses on each module, or a maximum of four addresses per port on a typical 13-port module. Additionally, it enhances the current chip's lockout-only capability with a new scrambling feature.

In order for the enhanced security features to work, there must be at least two addresses assigned to each port. The net manager can then distribute the remaining secure addresses throughout the module, stacking selected ports with more secure addresses than the others on an as-needed basis.

Cabletron will be working with a silicon vendor to develop the chip, but Cullerot declined to identify the company. Sources close to the company, however, said National will be involved.

Getting a reaction

The chip will be able to react in one of two ways if someone tries to log on to a port from an unauthorized address. It can send a trap to the central management console reporting that an unauthorized user is on the network or send a trap and disable the port.

The new scrambling capabili-

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NET may absorb Adaptive sooner than first planned

By Jim Duffy
Senior Editor

REDWOOD CITY, Calif. — Network Equipment Technologies, Inc. last week said it is considering an early merger with its Adaptive Corp. subsidiary in order to quickly bring NET's ATM products to market.

NET and Adaptive are engaged in discussions on how best to integrate Adaptive's Asynchronous Transfer Mode technology into NET's product line, said NET Chairman and Chief Executive Officer Daniel Warmenhoven. The options include merging Adaptive, which was spun out from NET three years ago as a wholly owned subsidiary, back into the parent before 1994 as was originally planned, he said.

"There are discussions under way about how to exploit the ATM technology in an optimum way and in broadening its role in the NET company," Warmenhoven said. "Some of those include the potential of an early merger."

The firms are considering accelerating the original plan because NET recognized that ATM is going to have a far broader and quicker impact on the marketplace than previously forecasted, he said. "[ATM] is going to have implications across our product line," Warmenhoven said.

Warmenhoven did not offer details on where ATM is likely to emerge in NET's product line, but analysts believe the firm will continue to enhance the Adaptive products as opposed to integrating ATM into the IDNX line. Analysts speculate that NET will develop an ATM switch that fits between its IDNX 90 mux and Adaptive's high-capacity Synchronous Optical Network (SONET) switch, SONET Transmission Manager (STM)/18.

> "There are discussions under way about how to exploit the ATM technology."
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Several Wall Street analysts, however, said NET directors want to absorb Adaptive now because the subsidiary has fallen short of revenue projections for several quarters and is a drag on NET's earnings. Melding the company back into NET would shave operating costs, they said.

"Adaptive's plan was to do $25 million to $30 million in revenue" by this time, said Fred Ziegel of Punk, Ziegel, Noell in New York. "They're somewhere around $10 million."

According Rick Kimball of Montgomery Securities in San Francisco, Adaptive costs NET 20 cents a share each quarter.

Adaptive is shipping one product, the STM/18, which supports as many as 18 T-3 trunks.

That capacity is proving too high for users, who are still not subscribing en masse to pricey T-3 services. Hence, sales of the STM/18 are being cannibalized by lower end T-3 offerings, such as NET's IDNX 90 and switches from T3plus Networking, Inc., analysts said.

As a result, Adaptive is readying a lower end STM offering for mid-1993, analysts said.

According to Warmenhoven, Adaptive will be broadening the STM line, but he declined to provide further details. Although the STM/18 owns 27% of the SONET switch market, Warmenhoven acknowledged that revenue has fallen short of expectations.

Firm intros OS/2 version of multimedia help desk tool

Will also offer enhanced version of DOS offering.

By Skip MacAskill
Staff Writer

INDIANAPOLIS — Software Artistry, Inc. last week offered an OS/2 version of its multimedia help desk automation product and announced plans for a new DOS release during the first quarter of next year.

Expert Advisor is a knowledge-based package that combines basic help desk functions such as call tracking, problem management and reporting with a wide range of diagnostic technologies, including expert systems, computer-aided software, engineering-based reasoning and decision trees that aid in problem diagnosis and resolution.

Expert Advisor 1.0 for OS/2 offers all the functionality of the current DOS Version 2.2 and takes advantage of OS/2 features, such as multiple threads, peer-to-peer messaging, Database Manager and Presentation Manager.

A customizable graphical user interface lets users tailor Expert Advisor to meet a company's particular needs and requirements. Knowledge for the rules-based expert system is augmented with every call to the help desk.

Steps taken to correct a problem are logged into the call log and saved to a database. The knowledge base expands as the desk handles more problems.

Expert Advisor also has a nonlinear hypermedia feature that allows an operator to access certain information without backing out through a series of menus. If an operator is in the middle of a call, for example, and wants to access the caller's location profile, the person can click on an icon at the top of the screen, get the information and then directly return to the original screen.

> The new DOS release will run 10 times faster and require a third less memory than 2.2.
>
> ▲▲▲

The package offers multimedia options, including full-motion video, voice, graphics and full-scale animation.

The new 32-bit OS/2 version uses SQL and allows users to store data in IBM's OS/2 Database Server and SQL/400 servers as well as Novell, Inc.'s NetWare SQL. Support for SQL servers from Microsoft Corp., Oracle Corp. and Sybase, Inc. will be added during the first half of 1993.

The product runs on all networks supporting OS/2 2.2 clients. Pricing for a typical configuration with a 10-user license starts at $65,000. It will ship in the first quarter of 1993.

The new DOS release, Version 3.0, will run 10 times faster and require a third less memory than 2.2. It is also expected to ship in the first quarter next year, with pricing and complete details available at that time.

Color Tile, Inc., a retailer based in Fort Worth, Texas, has been using Expert Advisor's 2.2 DOS version on its help desk for 18 months to support more than 750 stores nationwide. In that time, the company has dropped the average call time from 10 minutes to two minutes and increased its call load from 3,000 calls per month to 15,000 calls per month — all accomplished while actually reducing help desk staff levels.

"We can't operate without Expert Advisor," said Mike Vils, information center supervisor for Color Tile. "It's helped us manage our calls better and keep better track of them."

NSF changes Internet course plan

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services because industry will no longer have to compete against a single federally subsidized backbone provider.

NSF Director of Networking Steve Wolff said the plan to use the 155M bit/sec backbone primarily to connect four NSF supercomputer centers reflects the requirements in Sen. Al Gore's High-Performance Computing Act of 1991, which calls for development of a gigabit-speed National Research and Education Network.

In its earlier draft solicitation for an NSFNET backbone upgrade, NSF said it would select a bidder to provide 155M bit/sec services to replace the T-3 network services Advanced Network & Services, Inc. (ANS) provides for the Internet today.

The NSF also proposed the creation of half a dozen federally subsidized Network Access Points (NAP) to satisfy the federal Acceptable-Use Policy (AUP), under which the federal government restricts traffic from commercial companies to research- and education-related data. This policy is intended to keep the federal government from subsidizing commercial efforts and preventing its investment in networking from undercutting private-sector carriers.

The NAPs were to be Fiber Distributed Data Interface-based rings to which carriers would connect at T-1 speeds. Traffic meeting AUP guidelines would be allowed on the 155M backbone, but commercial traffic would have to use alternative delivery services.

At the Federal Networking Council Advisory Committee meeting here last week, Wolff said the backbone and NAPs will be part of the final solicitation but will serve quite different purposes than originally envisioned.

The backbone's primary purpose will be to link four supercomputer centers — Cornell Theory Center, the National Center for Supercomputer Computing, the San Diego Supercomputer Center and the Pittsburgh Supercomputer Center — and support bandwidth-intensive applications for research and educational use only.

Another change expected in the final solicitation is that NSF will allow the private sector to build NAPs using their own funds. The decision is expected to create a proliferation of network points where regional providers and others could interconnect to share traffic. "I strongly believe the private sector will put us out of the NAP business very shortly," Wolff said.

The NSF announcement won universal acclaim at the meeting, an event rare to the contentious network industry.

"It captures the synergies and interests in the private sector for effectively, and in a timely way, transitioning [the Internet] to the private sector," said Tony Rutkowski, director of technology assesement at Sprint International.

Al Weis, president of ANS, also applauded the decision. "I think it's the right direction. It puts reason back into why industry would want to participate" because bidders will now be able to both build the backbone and the NAPs.

"Even I am impressed," said Kenneth King, head of the university consortium Educom and chair of the advisory council, which last week gave NSF a vote of confidence in its decision.

Blue Cross and suppliers team

continued from page 2

that want to minimize toll fraud, which analysts estimate will have cost U.S. firms more than $2 billion in 1992 alone.

"You can never prevent toll fraud," said Fran Kayser, manager of national contracts for Blue Cross here. "But you can take steps to greatly minimize your exposure to it."

A helping hand

Under their arrangement with Blue Cross, AT&T and MCI both will send magnetic tapes with calling information to AAC, which will process the data and prepare weekly and monthly reports for the firm's network managers.

AT&T will provide AAC exception reporting data for its Software-Defined Network service; MCI will do the same for its Virtual Network and 800 services.

"This is a precedent-setting arrangement between companies and an exciting breakthrough that shows how far [carriers and vendors] will go to help their customers deal with toll fraud," said John Haugh, author of *Toll Fraud and Telabuse: a Multibillion Dollar National Problem* and president of Telecommunications Advisers, Inc., a Portland, Ore., firm that specializes in toll fraud consulting.

Although carriers monitor customers' traffic patterns and some even offer toll fraud protection services, users have argued that carriers need to do even more to help them detect and stop toll fraud.

Richard Lippincott, manager of major account sales for AAC, said the firm uses 25 internally developed exception algorithms in its system to spot toll fraud. The vendor analyzes call detail data to detect exception patterns that suggest potential toll fraud and abuse, such as excessive or overlapping domestic code and credit card use, as well as unusual international calling.

Kayser said the reports provided by AAC will contain graphic depictions of calling patterns at Blue Cross sites, as well as a paper copy of call detail records in a common format for calls made using AT&T and MCI services.

Macs to play peer role in nets

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On the NetWare server, support for both AppleTalk and TCP/IP are provided inherently in the NetWare 2.X environment, but in NetWare 3.X environments, users need to add a NetWare for Macintosh NetWare Loadable Module.

Mac IPX is expected to be released for beta testing to an additional 40 developers in January and will likely be generally available in April, according to Steve Nelson, director of marketing at Novell's Desktop Systems Group, based here.

Nelson predicted that the first products using the APIs will also come out in April with the release of the first generally available developers' kit.

The products that will be built using the API might include, for example, peer-to-peer file-transfer programs, Nelson said. He added that Novell plans to build its own applications based on the Mac IPX APIs, although he would not be more specific.

According to analysts, Mac IPX is a long time in coming. "This is, without a doubt, something users have been pounding down the doors for," said Peter Kastner, vice-president and analyst at Aberdeen Group, Inc., a Boston-based consulting and research firm. "Apple has been standing naked for two years as enterprise customers have locked them out of the network."

Kastner explained that because Macintoshes cannot communicate with the rest of the network using IPX, they are often seen as second-class citizens — therefore, not viable network-based alternatives — by many corporate users.

But the Macintosh's second-class status extends beyond mere connectivity limitations. Other observers said that because Macintoshes do not support IPX, they cannot access IPX applications even if they are on a NetWare LAN. "Today, for example, if you have a database program that only supports IPX, Macintosh users can't get to it," Nelson said.

Enabling Macintosh users to communicate directly with DOS or OS/2 users in a peer fashion is also important because of the growing interest in work group and work flow applications.

"If you have a NetWare network with Macintoshes and you want to create a work flow application, you can't do it between [IPX]-based NetWare clients and [AppleTalk]-based Macintoshes," said Jamie Lewis, vice-president at The Burton Group, a Salt Lake City research and consulting firm.

It would also be helpful for Novell to be able to provide peer-to-peer capabilities between all clients supported under NetWare, as the new version, 4.0, is expected to have inherent peer-to-peer networking capabilities. However, Nelson said Novell does not plan at this time to include Mac IPX support in NetWare 4.0.

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

> "DEC does not have a comprehensive OSI solution because we have not shipped X.500."
>
> **Robert Segrest**
> Director of network development
> Federal Science & Research
> Digital Equipment Corp.
> Washington, D.C.

Data Packets

Wall Data, Inc. of Redmond, Wash., said Digital Equipment Corp. will resell a new Wall Data product that allows Windows clients to access IBM host data through DEC Systems Network Architecture gateways.

DEC will remarket Rumba for Pathworks, software that allows Windows workstations on DEC Pathworks local-area networks to emulate IBM terminals so they can access data from IBM mainframes.

Rumba for Pathworks works exclusively with DEC's DECnet/SNA gateways.

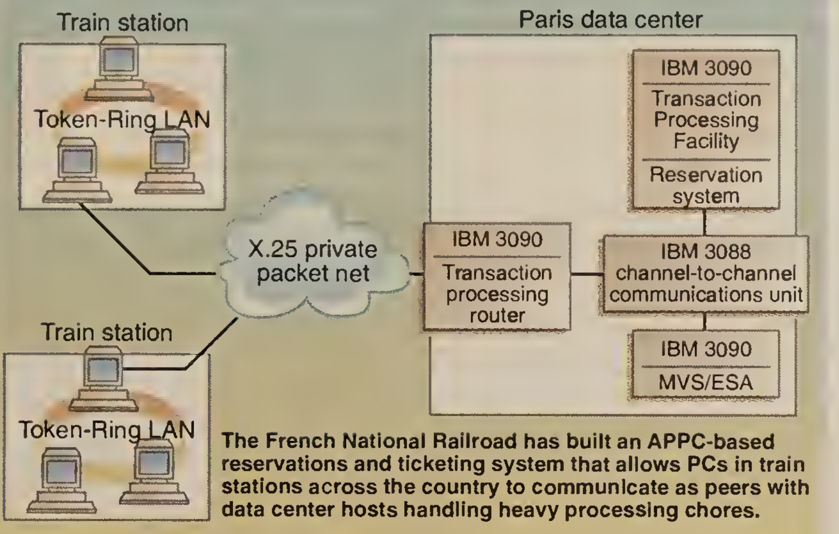
Rumba for Pathworks is available now for $450.

Platinum Technology, Inc. last week announced an SQL-based interface that lets personal computers access IBM CICS, IMS or DB2 database applications.

The Mainframe Transaction Server maps SQL calls from PCs to 3270 applications, rather than using the 3270 Emulation High Level Language Application Program Interface calls generally used to gain access to legacy applications. The Transaction Server lets users download specific data from the databases, saving PC memory and removing excess data traffic from the net.

The product will ship in the first quarter of 1993 for $47,900 to $185,845, depending on processor size.

France's national railroad takes APPC/LU 6.2 track



The French National Railroad has built an APPC-based reservations and ticketing system that allows PCs in train stations across the country to communicate as peers with data center hosts handling heavy processing chores.

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: AMERICAN AIRLINES, INC., DALLAS

Companies report success with APPC implementation

Users lead charge to employ IBM technology.

By Michael Cooney
Senior Editor

SAN FRANCISCO — Not so long ago, finding users building their networks on IBM's Advanced Program-to-Program Communications/LU 6.2 was a rarity. Not so any more.

Two companies — Societe National de Chemins des Fer Francais (SNCF), also called The French National Railroad, and Mobil Natural Gas, Inc. — that have embraced APPC to improve net performance and speed application development detailed their experiences with the technology at IBM's recent APPC Developers' Conference here, which was cosponsored by *Network World*.

SNCF had a hierachical mainframe network supporting Transaction Processing Facility (TPF)-based applications for reservations and scheduling. TPF, which has supported APPC since 1990, is a high-performance transaction processing monitor for large systems.

In the last year, the firm replaced most of its 3270 terminals with OS/2-based personal computers linked to Token-Ring local-area networks in 500 train stations throughout the country. The remote sites are linked to a data center in Paris via an X.25 private net.

Now a specially designed TPF system in the data center routes incoming reservation traffic or other messages using LU 6.2 to eight IBM mainframes that handle SNCF's APPC-based RESARail ticketing applications or other applications such as scheduling or network management.

SNCF migrated to APPC primarily to improve net throughput, said Toby Pennycuff, a systems engineer in the applications development section of American Airlines, Inc.'s SABRE Computer Services division in Dallas. SNCF purchased a SABRE system to serve as a key component of its RESARail applications.

According to Pennycuff, SNCF's 3270-based TPF system was handling as many as 15 messages or transactions per second (TPS), but it needed to go well beyond that number.

Unlike 3270 applications, APPC programs can handle multiple sessions and requests over a single link. The APPC-based RESARail applications, using LU 6.2, can handle up to 90 TPS.

The APPC applications were phased in gradually using many APPC testing tools along the way. "REXXAPPC and the OS/2 LU 6.2 testing tools were absolutely invaluable," he said.

Mobil concurs

Users at Mobil Natural Gas also lauded IBM's APPC development tools. According to James Parker, systems consultant with Mobil Natural Gas in Houston, tools such as REXXAPPC helped speed the firm's APPC implementation. REXXAPPC lets users build a pilot APPC application for use in a production environment to gauge its impact on the net.

(continued on page 14)

Single-system mgmt. falling from grace

Volatile nets, new applications have made users' hope for a do-it-all mgmt. platform slim to none.

By Jim Duffy
Senior Editor

Once considered a lofty but attainable goal, the idea of building a single system to manage the mass of multivendor devices in a corporate network is now looked upon as fruitless.

Faced with networks that continually change, unpredictable traffic patterns, new and unfamiliar applications and systems that are continually upgraded, it is unreasonable to expect that anyone could develop a single management platform to preside over an infrastructure so dynamic and unstable, observers say.

Although users have long desired a single system for integrated management of network elements, they now concede that such a prize is impractical.

Instead, they are opting for platforms that provide a basic set of management services and run function-specific management applications from several vendors, or they continue to control their networks with myriad subnetwork, or element, managers.

Vendors bit off more than they could chew by trying to provide "managers of managers" (MOM), according to Leslie Maltz, director of computer and communications resources at Stevens Institute of Technology in Hoboken, N.J. "It's too ambitious, and they're not really understanding the problems" users face in managing their networks, which are varied and numerous, Maltz said. "We really haven't seen where one size fits all."

This message is beginning to sink in with vendors. British carrier BT earlier this year yanked its Concert umbrella management product off the market due to slow sales and is instead offering Concert functionality as a service to customers.

In addition, AT&T recently disclosed that it is considering pulling its four-year-old Accumaster Integrator from the market for similar reasons. Like BT, AT&T cited user preferences for carrier-provided management services.

(continued on page 14)

Vendors enhance TCP/IP wares for DEC platforms

By Jim Duffy
Senior Editor

Two vendors of TCP/IP software for Digital Equipment Corp. systems last week detailed major new releases of their products designed to enhance connectivity between DEC and non-DEC platforms.

Process Software Corp. of Framingham, Mass., and TGV, Inc. of Santa Cruz, Calif., both unveiled Transmission Control Protocol/Internet Protocol software for DEC's OpenVMS operating system, a Portable Operating System Interface-compliant version of DEC's proprietary VMS that debuted last summer.

Process Software's TCPware Version 3.1 runs on DEC VAX and Alpha systems under OpenVMS. TCPware 3.1 includes a feature called NFS Client which allows users to access files stored on Network File System (NFS) servers from OpenVMS applications.

With NFS Client, users can issue transactions to many servers simultaneously without knowing the servers' 32-bit TCP/IP address. Users only have to know the name of the system where the files are located, which saves time when there are several Unix machines on the network, according to Process Software.

Another TCPware 3.1 feature is NFS-Plus, software that enables a VMS or OpenVMS system to act as an NFS client, server or both, depending on user requirements.

"Our competitors made an effort of separating the two," said George Khater, Process Software's product marketing manager. "Users expect to get [NFS

(continued on page 14)

Carriers unite to revamp plan

continued from page 2

"If electronic mail is to become as widespread as we would like, issues like this have to be out of the way," Sharp said.

Rowe

Sharp joined other users, including representatives from Allied-Signal Corp., Boeing Co., Citicorp and Mitre Corp., at a meeting hosted by Advantis in Tampa earlier this month where users from the U.S. CCITT Study Group subcommittee on message handling presented the proposal to industry ("User seeks backing for X.400 proposal," *NW*, Nov. 16).

The U.S. Message Transfer Backbone Service proposal asks that users and vendors support an option in the 1988 X.400 standard for message addressing, in which the carrier — known as the Administrative Management Domain (ADMD) — is identified simply as a single space rather than the full carrier name. Users, whose organizations are identified as Private Management Domains (PRMD), would then be able to switch carriers without having to change the address.

The seven information providers, which, in addition to Advantis, includes AT&T EasyLink Services, BT North America, Inc., Infonet, MCI Communications Corp., Pacific Telesis Group and Sprint International, last week responded to the demands presented at the earlier user meeting by creating an implementors' group to define a routing scheme that will accommodate the new address format.

"It is of interest to us because our customers are asking us to support it," said Madeline Sorrentino, product manager for X.400 and directory services at AT&T EasyLink Services.

Ella Gardner, technical staff member at Mitre Corp., commented, "We're really optimistic the carriers will provide this service based on the formation of this group."

The ANSI has agreed to act as the registration authority responsible for distributing unique ADMD and PRMD to users and carriers, said Gary Rowe, principal with consultancy Rapport Communication, Inc. and chairman of US-NMTS Group.

As a "guiding vision" for the messaging project, the carriers will look to U.S. CCITT Message Handling Service subcommittee documents and a similar message backbone pilot that BT and other European carriers are conducting in the U.K.

"In general, we believe it's technically feasible and we can implement it," said Sorrentino. "It will, in fact, provide a more reliably connected network to our users because it provides for alternate paths."

Joline Chew, senior product manager for BT, agreed. "We'll be able to provide redundant subroutes through other providers for messaging," she said. "Users could split traffic between providers." ◘

PBX interoperability spec nears standard

continued from page 3

PBX, said users anxious for ISDN and unwilling to wait for international carriers to standardize can use Q.Sig to establish private ISDN networks anchored by PBXs.

In addition to specifying how switches share information regarding call setup and teardown and basic calling features such as call waiting, Q.Sig defines a common set of features.

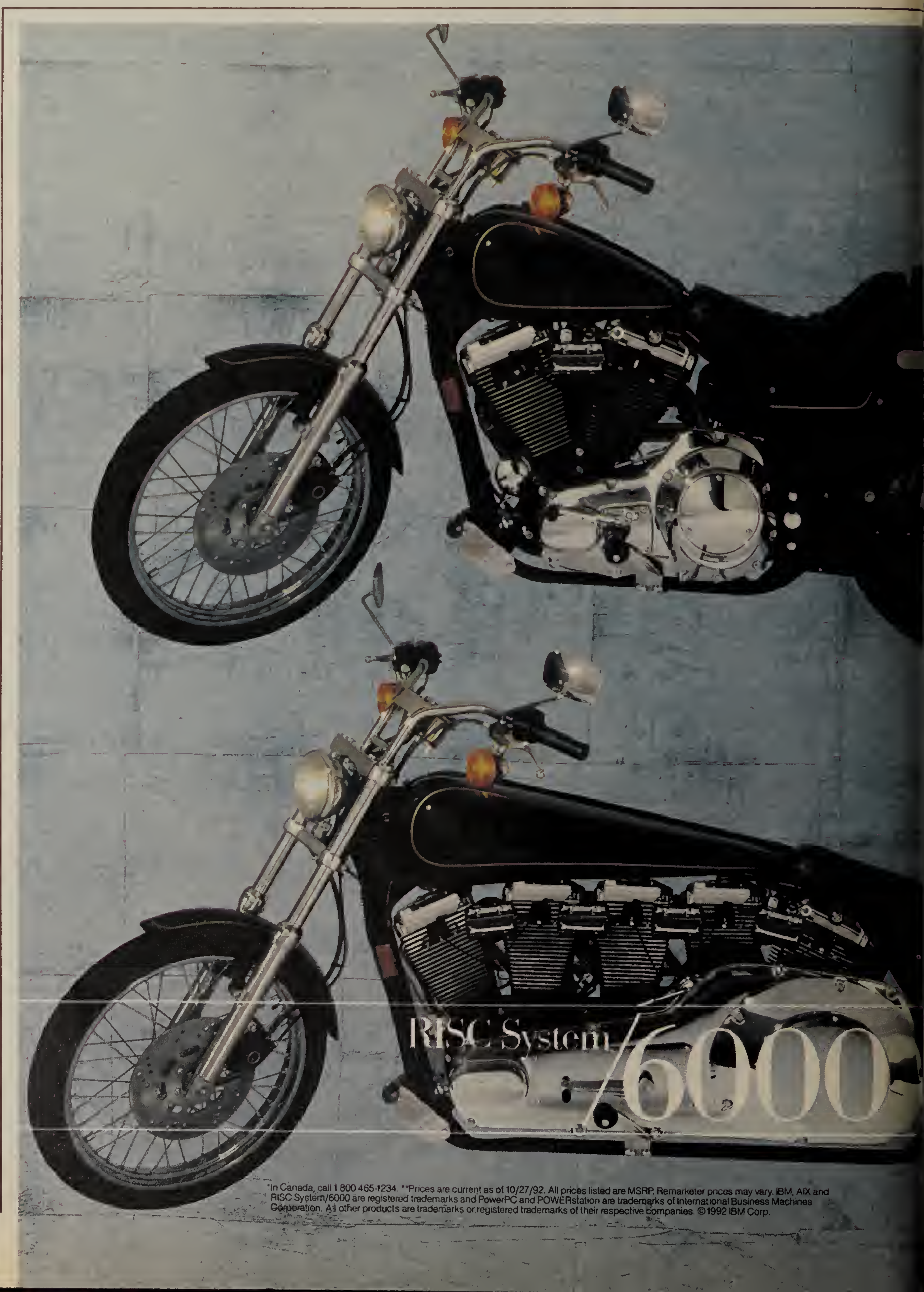
For example, ISDN switches that use Q.Sig can either allow or prevent the transmission of a caller's identification from the sending switch to other switches in a private ISDN network. Also, Q.Sig's transit counter feature lets telecommunications managers set the number of calls that can be rerouted through the originating switch if the primary path through a private ISDN net is not available.

Rolm's Tissot said Q.Sig's class mark feature enables users to set a limit of hops that calls can take across the network to their destination, which is of great import to multinationals with large networks.

"Companies wouldn't want calls traveling back and forth through a private ISDN network for long periods," Tissot said. "Instead, after a set number of hops, the last switch would send a negative acknowledgment back to the [originating] switch."

Users say the standard could alleviate some headaches. "We have an interest in and a need to include several vendors' PBXs here and abroad in our network," said Reuben Lantto, director of international telecommunications for Cargill, Inc., a Minneapolis-based chemical products manufacturer. "Users with international nets better make sure their vendors' PBXs will support this [specification]."

According to Minzy, Ericsson and other PBX vendors have already implemented Q.Sig in their latest software. ◘



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New features to shore up IBM's APPN

continued from page 1

failures and lagging performance are two of the most serious impediments to APPN acceptance, analysts said. By adding these features, IBM will quiet users concerns and eliminate critical differences between APPN and the Transmission Control Protocol/Internet Protocol.

ANR and RTP are the building blocks of APPN+ — what IBM now calls High Performance Routing — which the firm announced in March. APPN+ defines how IBM intends to build high-speed APPN nets.

Together, ANR and RTP will replace the current APPN Intermediate Session Routing function, which spans Network Layer 3 and Transport Layer 4, respectively, in the APPN architecture.

ANR will provide connectionless, end-to-end routing of data over APPN nets, eliminating the intermediate routing function that exists in current APPN implementations.

Today, packets traversing an APPN net must be processed all the way up the seven-layer comunications stack at each intermediate Network Node. ANR streamlines the procedure by requiring packets to be passed up to only Layer 4, saving processing tasks and time.

"Depending on the users implementation, we expect ANR to improve APPN network performance three to 10 times over existing implementations," said Marcia Peters, team leader of APPN architecture development for IBM.

RTP will provide the pacing or flow control and error recovery for APPN data as it crosses the APPN net. It will sense net congestion or outages and reroute the data around the problem without interrupting the session.

Today's APPN nets use adaptive pacing for data flow control, which lets each intermediate Network Node slow or speed up data as it crosses the net. With RTP, "error recovery and data flow control are done end-to-end rather than at every node, saving a considerable amount of processing," Peters said. "RTP will prevent congestion, rather than react to it."

The key benefit of APR and RTP is that they will not have to reside on every APPN node in the net, Peters said. "We think that if users have three or more HPR nodes in their APPN net they will begin to see overall improvement," she said. "We also feel that with the improved flow control and automatic rerouting capabilities, we now have a superior product offering to TCP/IP."

Analysts and users agreed with Peters' assessment, adding that the enhancements are part of IBM's strategy to make APPN bulletproof so that Systems Network Architecture users will have no reason to look elsewhere — especially to TCP/IP — for their wide- or local-area networking needs.

"IBM has been concerned about TCP/IP displacing SNA users, and it wants to control that," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J. "These features will eliminate two of the features TCP/IP had over APPN and make APPN more competitive."

According to Steve Simon, a telecommunications engineer with The Travelers Corp. in Hartford, Conn., ANR and RTP are the two most critical pieces IBM could add to APPN.

"[But] when are they going to add them?" he asked. "TCP/IP has this stuff now. IBM has to move fast."

Peters said users can expect the new features to turn up in 12 to 18 months. For third-party software developers, Peters said the ANR and RTP features would come with the Network Node license, which currently sells for $400,000.

According to Louis Herndon Wells, editor of the "SNA Perspective" newsletter in San Jose, Calif., "IBM is telling users making strategic networking plans that APPN is going to get a lot faster over time and they can begin implementing APPN with that in mind." ◘

Cabletron to use chip for new security

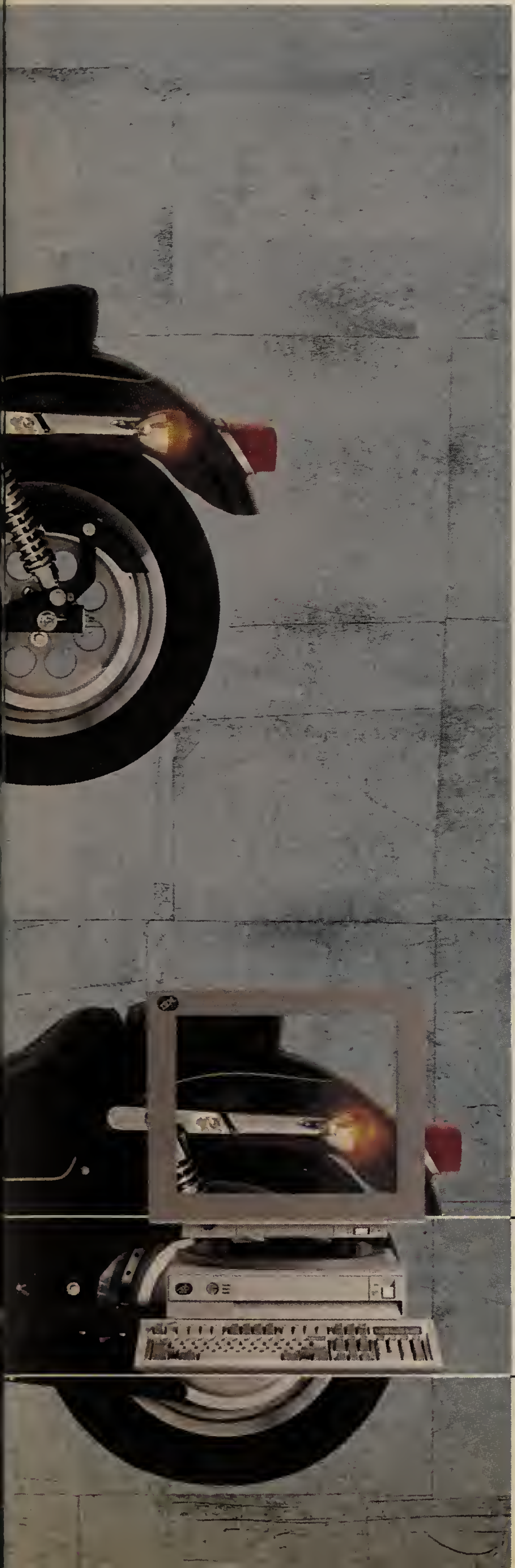
continued from page 3

ty, which can be enabled and disabled by the net manager, will provide a secure traffic path between any two ports on the module while it scrambles the packets delivered to other ports.

The scrambling feature will also automatically lock out any dormant ports on the network.

If a person tried to tap into a user's network with a local-area network analyzer from an unused office jack, for example, the scrambling capability would prevent the analyzer from capturing or sending packets.

Pricing for the Cabletron offering was not available. ◘



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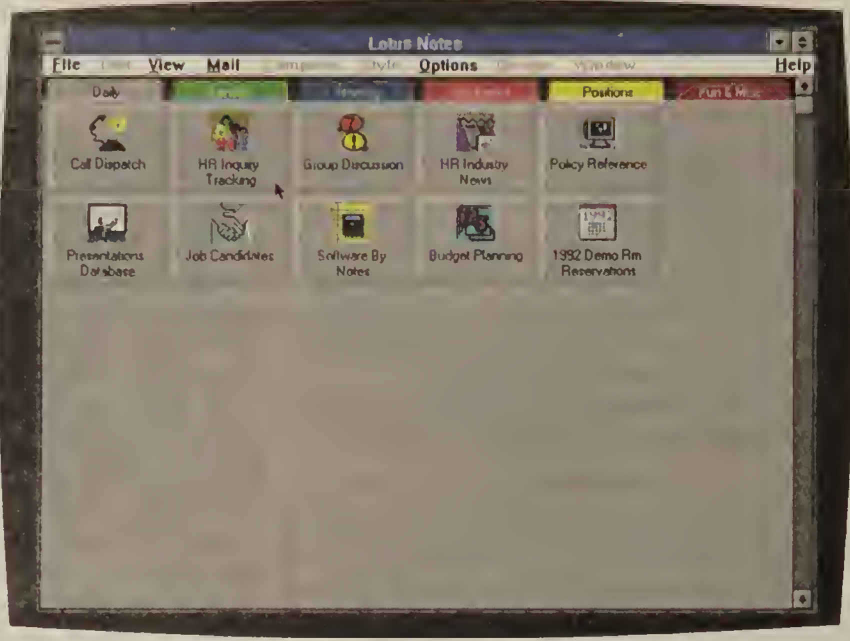
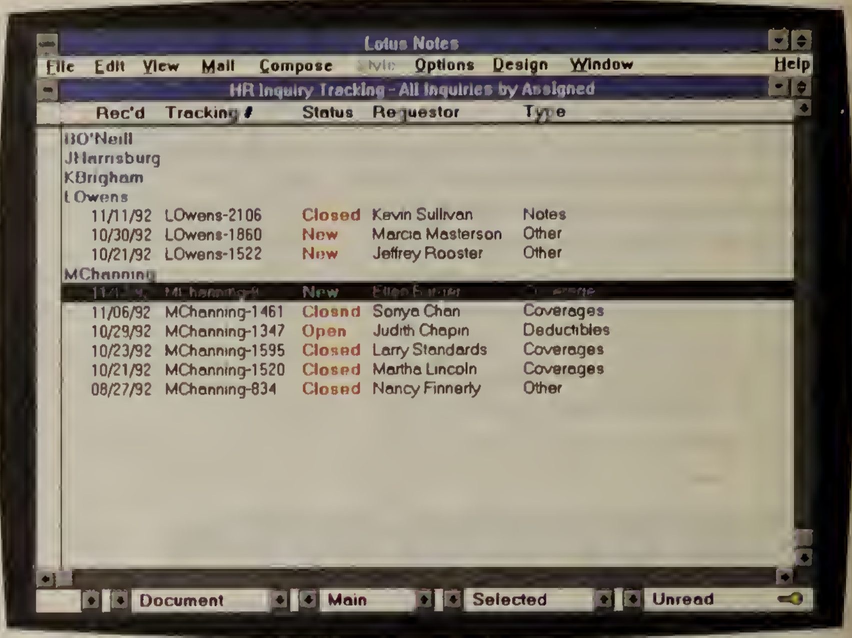


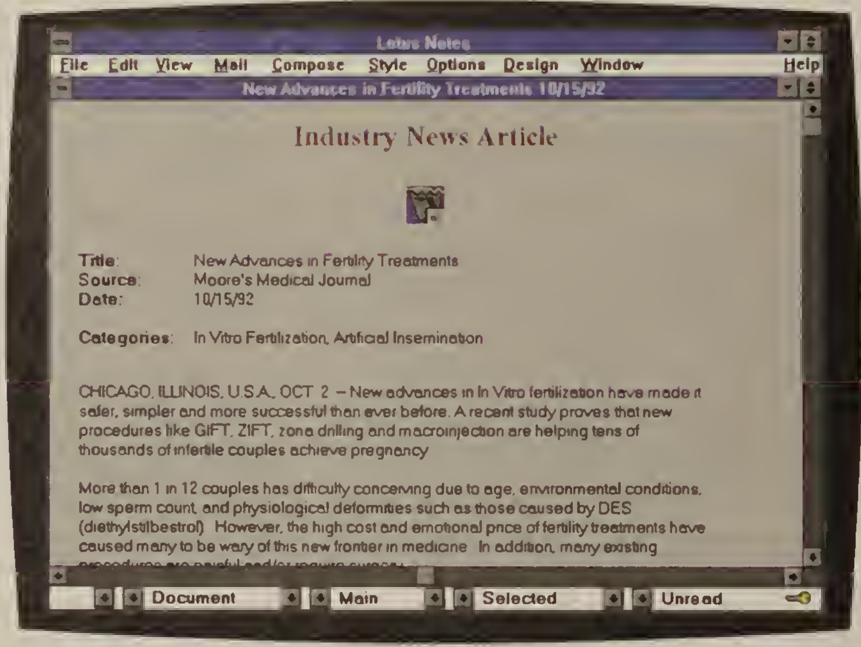
1. This is Mike's Notes desktop. Each icon represents a different database. In the course of the day, these are the ones he uses most frequently. To start the day, Mike decides to check if any new benefits questions have been forwarded his way. He double-clicks on the HR INQUIRY TRACKING icon.



HR Inquiry Tracking - All Inquiries by Assigned

Rec'd	Tracking #	Status	Requestor	Type
BO'Neill				
JHarrisburg				
KBrigham				
LOwens				
11/11/92	LOwens-2106	Closed	Kevin Sullivan	Notes
10/30/92	LOwens-1860	New	Marcia Masterson	Other
10/21/92	LOwens-1522	New	Jeffrey Rooster	Other
MChanning				
[illegible]	[illegible]	New	Ellen Burger	[illegible]
11/06/92	MChanning-1461	Closed	Sonya Chan	Coverages
10/29/92	MChanning-1347	Open	Judith Chapin	Deductibles
10/23/92	MChanning-1595	Closed	Larry Standards	Coverages
10/21/92	MChanning-1520	Closed	Martha Lincoln	Coverages
08/27/92	MChanning-834	Closed	Nancy Finnerty	Other

2. Well, there's one that hasn't been read. Ellen Burger has a question about her coverage. Ellen called the company's BENEFITS HOTLINE. The operator entered her query into Notes and it was automatically routed to Mike. Mike double-clicks to find out what the problem is.



New Advances in Fertility Treatments 10/15/92

Industry News Article

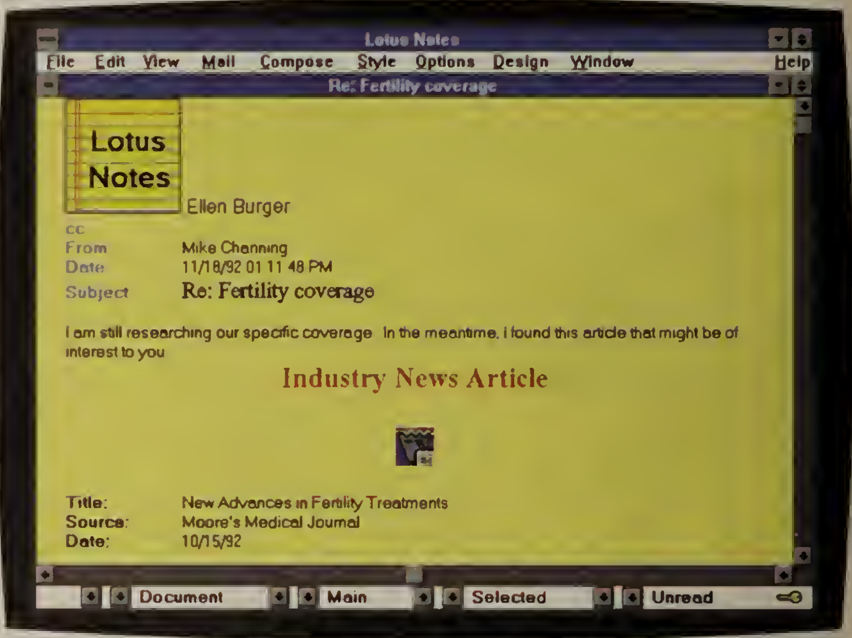
Title: New Advances in Fertility Treatments
Source: Moore's Medical Journal
Date: 10/15/92

Categories: In Vitro Fertilization, Artifical Insemination

CHICAGO, ILLINOIS, U.S.A., OCT 2 – New advances in In Vitro fertilization have made it safer, simpler and more successful than ever before. A recent study proves that new procedures like GIFT, ZIFT, zona drilling and macroinjection are helping tens of thousands of infertile couples achieve pregnancy

More than 1 in 12 couples has difficulty conceiving due to age, environmental conditions, low sperm count, and physiological deformities such as those caused by DES (diethylstilbestrol) However, the high cost and emotional price of fertility treatments have caused many to be wary of this new frontier in medicine In addition, many existing

5. He simply double-clicks INDUSTRY NEWS, and searches two categories: In vitro fertilization and artificial insemination. First up is a recent story from Moore's Medical Journal. Since the article includes authoritative information, he decides to forward it to Ellen.



Re: Fertility coverage

Ellen Burger
cc
From Mike Channing
Date 11/18/92 01 11 48 PM
Subject Re: Fertility coverage

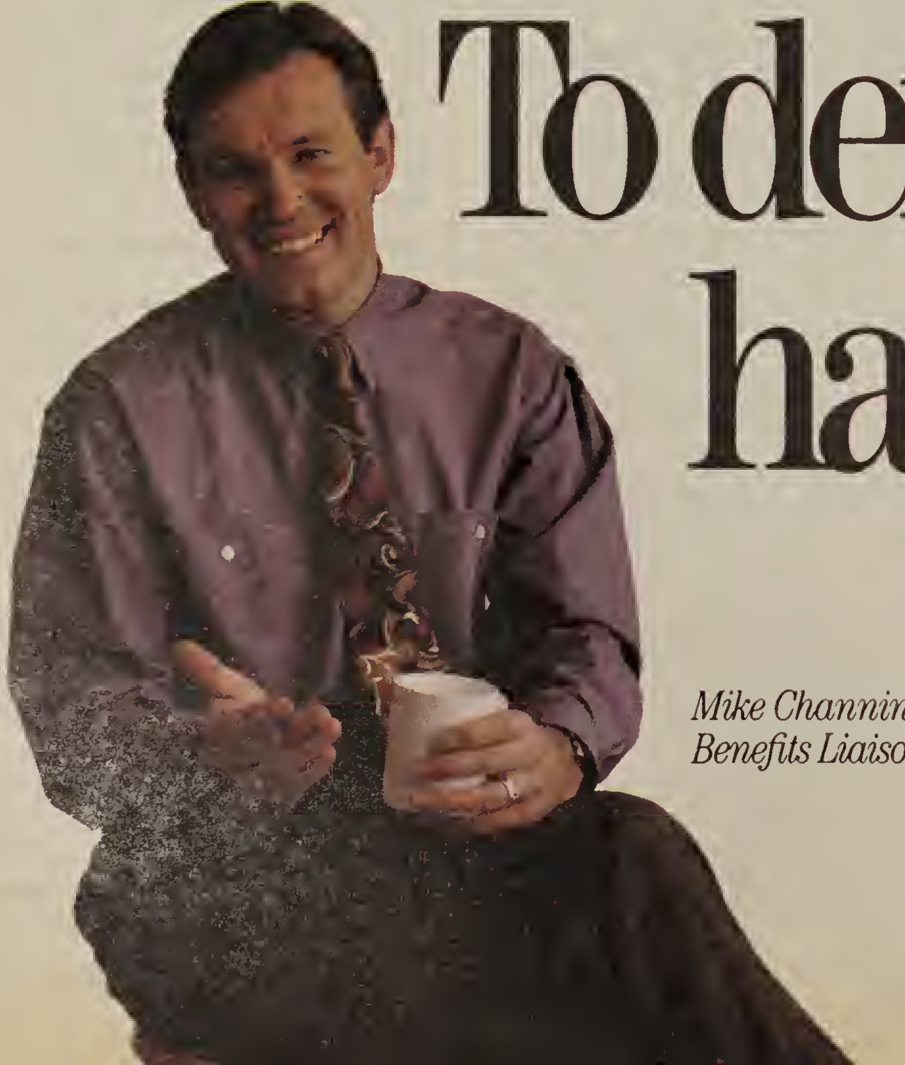
I am still researching our specific coverage In the meantime, I found this article that might be of interest to you

Industry News Article

Title: New Advances in Fertility Treatments
Source: Moore's Medical Journal
Date: 10/15/92

6. Mike quickly composes a note and forwards this document directly to Ellen. That done, he gets himself a cup of coffee.

To demonstrate th had to make an



Mike Channing
Benefits Liaison

According to critics, including our competition, Lotus Notes® is one of the most exciting software products you can buy. We'd like to show you why.

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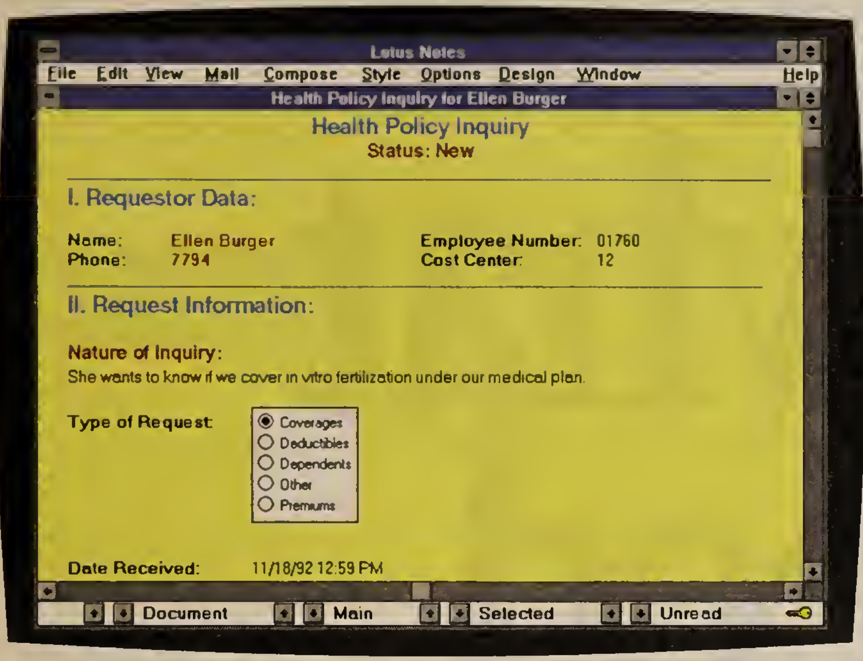
Let's watch how Mike Channing uses it: As a tracking tool for customer service. As a conferencing system for collaborative problem solving. And as a library for policies, documentation or news.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Health Policy Inquiry for Ellen Burger
Document Main Selected Unread

Health Policy Inquiry
Status: New

I. Requestor Data:

Name: Ellen Burger
Phone: 7794
Employee Number: 01760
Cost Center: 12

II. Request Information:

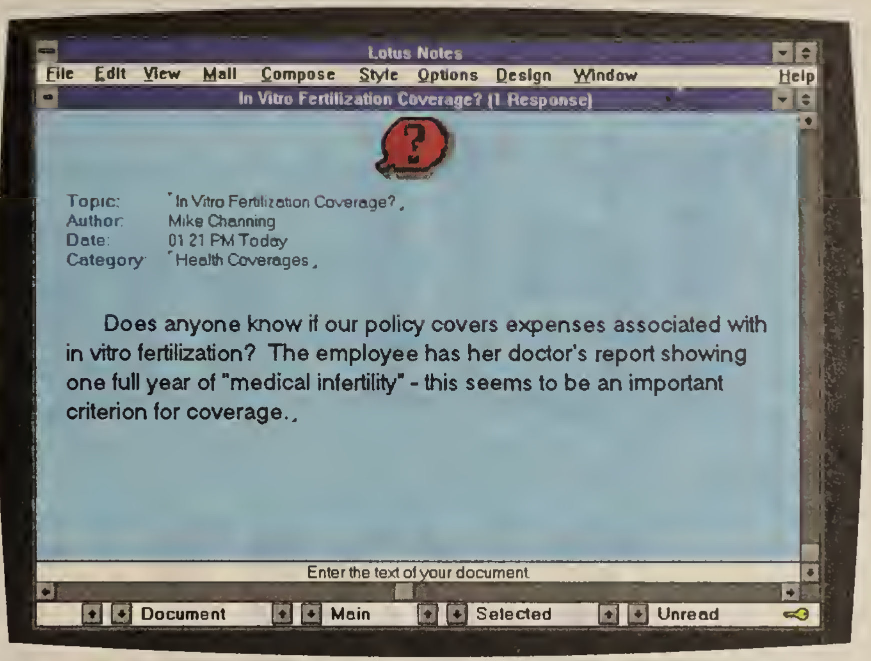
Nature of Inquiry:
She wants to know if we cover in vitro fertilization under our medical plan.

Type of Request:
● Coverages
○ Deductibles
○ Dependents
○ Other
○ Premiums

Date Received: 11/18/92 12:59 PM

3. HR Inquiry Tracking

Up comes the inquiry screen. Ellen wants to know if the company covers in vitro fertilization. Mike, being new, is stumped. He calls his supervisor on the phone for the answer. He's not in yet. Instead of waiting, Mike decides to post the question on the GROUP DISCUSSION database, thinking that someone else might know the answer and respond more quickly.

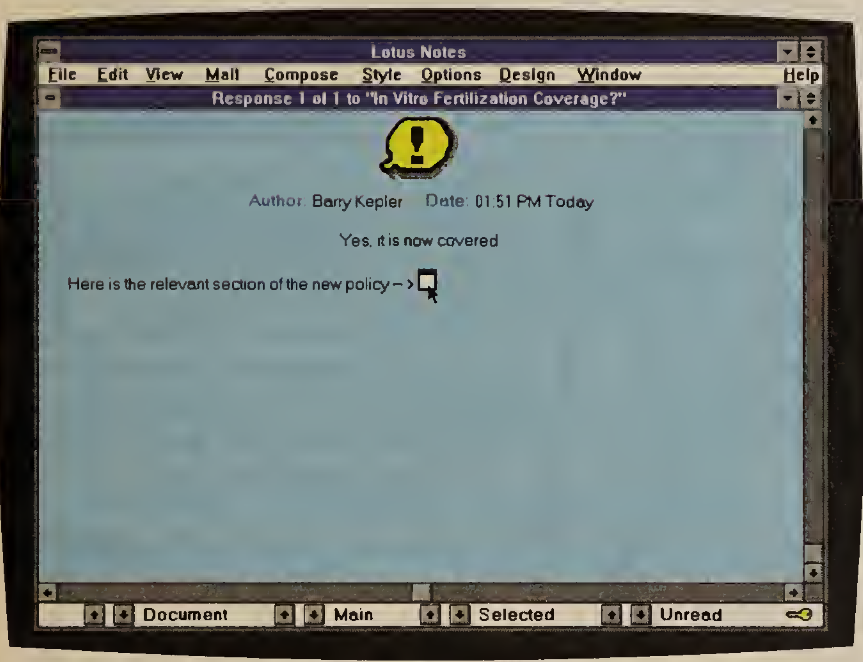

Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
In Vitro Fertilization Coverage? (1 Response)
Enter the text of your document
Document Main Selected Unread

Topic: "In Vitro Fertilization Coverage?"
Author: Mike Channing
Date: 01:21 PM Today
Category: "Health Coverages"

Does anyone know if our policy covers expenses associated with in vitro fertilization? The employee has her doctor's report showing one full year of "medical infertility" - this seems to be an important criterion for coverage.

4. Group Discussion

He double-clicks the GROUP DISCUSSION icon. Once in GROUP DISCUSSION, he poses the question to his workgroup. Eager to help, Mike then decides to check out the INDUSTRY NEWS database for any background information that might be useful to Ellen.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Response 1 of 1 to "In Vitro Fertilization Coverage?"
Document Main Selected Unread

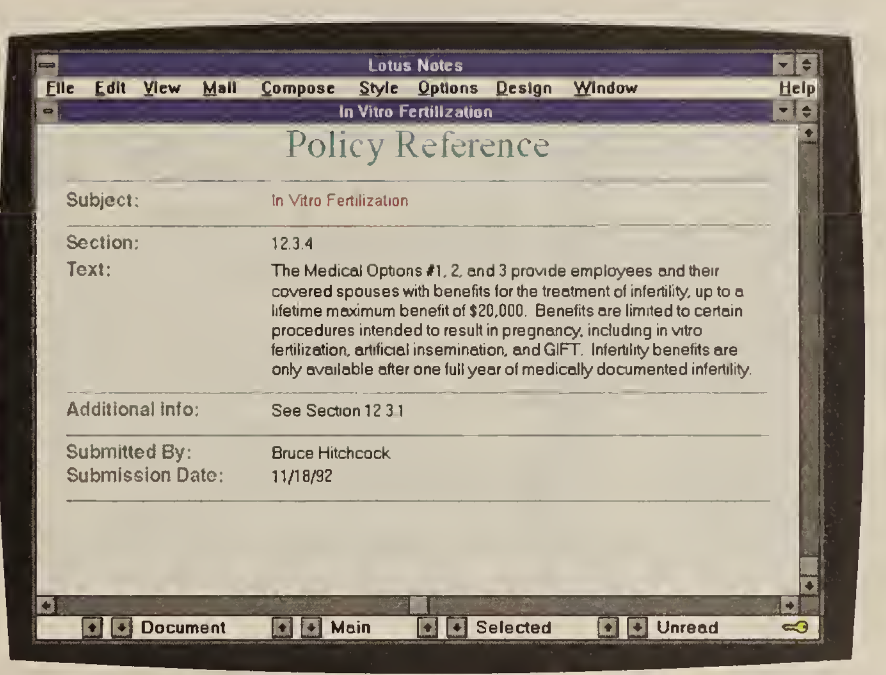
Author: Barry Kepler Date: 01:51 PM Today

Yes, it is now covered

Here is the relevant section of the new policy -->

7. Group Discussion

When he gets back to his desk, Mike checks back into the GROUP DISCUSSION database for responses. Not only has Barry Kepler responded with the answer, Barry actually leads Mike to the relevant section of the corporate policy manual by creating a direct link to the document.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
In Vitro Fertilization
Document Main Selected Unread

Policy Reference

Subject: In Vitro Fertilization

Section: 12.3.4
Text: The Medical Options #1, 2, and 3 provide employees and their covered spouses with benefits for the treatment of infertility, up to a lifetime maximum benefit of $20,000. Benefits are limited to certain procedures intended to result in pregnancy, including in vitro fertilization, artificial insemination, and GIFT. Infertility benefits are only available after one full year of medically documented infertility.

Additional info: See Section 12.3.1

Submitted By: Bruce Hitchcock
Submission Date: 11/18/92

8. Policy Reference

Mike clicks the DOC LINK icon. Up comes the relevant section of the policy. Mike jots a quick message and forwards both to Ellen. Job done, in less than 10 minutes, by easily tapping into expertise both inside and outside the company.

e power of Notes, we example of Mike.

Watch how Notes organizes information so it's easy for Mike to get the answers he needs. How effortlessly he taps his workgroup's knowledge. How quickly he accesses conventional references. Now you can see why people who have Notes build their work around it. And why the companies that have installed Notes have seen as much as a 400% return on their investment.*

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Lotus® Notes

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WELLFLEET communications

Wellfleet offers a family of high-performance multiprotocol routers. The Feeder, Link, Concentrator, and Backbone Nodes use Wellfleet's Advanced Communications Engine to provide multi-vendor connectivity for LANs and WANs.

NetWorth™
An Ungermann-Bass Partner

NetWorth's Series 4000 Intelligent Hub provides manageable connectivity for departmental Ethernet networks. Recently, NetWorth announced its exclusive NetWare Application Engine, providing a brand new method for centralizing NetWare communications services right in the hub.

Apple Computer

Falcon also represents manufacturers of AppleTalk products including Apple, Farallon, and Shiva.

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LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

> "ATM will not waltz into the Fortune 1,000. [For one thing] 100M bit/sec Ethernet adapters at $300 to $400 will fill the need for higher speeds" to the desktop.

Paul Callahan
Senior analyst of network
strategy research
Forrester Research, Inc.
Cambridge, Mass.

Netnotes

Brightwork Development, Inc. of Tinton Falls, N.J., last week announced upgrades to two of its products: LAN Server Watch, for net monitoring, and NETremote, for remote network diagnostics and troubleshooting.

LAN Server Watch 1.1 can now monitor more than 50 system parameters for Novell, Inc. NetWare 2.X servers and 24 system parameters for NetWare 3.X servers. Altogether, it provides an additional 20 alerts.

Some of the new alerts for both environments include account and print queue parameters and expanded notification options, such as letting the administrator set renotification intervals.

For remote personal computer management, NETremote 5.1 now supports asynchronous communications links and allows direct access to NetWare administration utilities. For example, with the new version, administrators can now troubleshoot and support remote PCs via a modem connection. And they can now access PConsole and FConsole information by clicking on the appropriate icon, instead of exiting NETremote to access that data.

LAN Server Watch 1.1 and NETremote 5.1 are available now for $695 and $495, respectively, per file server. ◻

HP covers server mart with new Series 800 models

The RISC-based servers come in four classes.

By Timothy O'Brien
West Coast Bureau Chief

PALO ALTO, Calif. — Hewlett-Packard Co. has kicked up the competitive pressure in the Unix server market with the introduction of 13 new models of the HP 9000 Series 800 family, ranging from low-end servers to mainframe alternative systems.

HP is offering these new servers, based on the company's Reduced Instruction Set Computing, in four classes that include two-, four-, eight- and 12-slot packages for I/O board expandability. The new systems also support 20% faster disks.

At the low end of the new server line is the Model F10, which comes standard with 16M bytes of random-access memory and 500M bytes of storage and can be upgraded to 384M bytes of RAM and 42G bytes of storage.

At the high end, HP's 150 server comes standard with 64M bytes of RAM and 2G bytes of storage but can be upgraded to 768M bytes of RAM and nearly 180G bytes of storage.

Customers that select base systems initially can add options that increase the processing power or disk capacity of the servers.

For instance, future versions of the servers are designed to accommodate multiprocessing. Currently, symmetric multiprocessing is only available on HP's mainframe-class Corporate Business Systems.

In mid-1993, HP said it will offer symmetric multiprocessing upgrade packages for these servers that will boost performance of the high-end systems by more than 75%.

However, Bernard Guidon, general manager of HP's General Systems Division, claimed that some of these single-processor servers today outperform rival multiprocessor machines from Sun Microsystems, Inc. and NCR Corp.

"With the single-processor HP H50 computer, we have achieved better database benchmark results than Sun with its four-processor SPARC 690 machine and

(continued on page 12)

Tally unveils inventory pack for net

By Joanne Cummings
Senior Writer

BOSTON — Tally Systems Corp. is expected to unveil at next month's NetWorld 93 Boston show here server-based software that automatically compiles inventory information about LAN-attached personal computers and associated software.

NetCensus is a local-area network version of the company's stand-alone PC Census product. Through polling, it creates an inventory that includes brand names and version numbers of all hardware, software packages, communications cards and other workstation components. In addition, NetCensus collects detailed data on node setup, network shell versions and modem cards.

NetCensus runs in any Novell, Inc. NetWare, Banyan Systems, Inc. VINES or Microsoft Corp. LAN Manager environment. It maintains inventories on a server-resident database and automatically flags any changes that occur between polls, said Tom Cecere, Tally's director of marketing.

The tool features a Scheduler utility that enables network managers to initiate daily, weekly or quarterly inventories of all attached PCs when each user logs on.

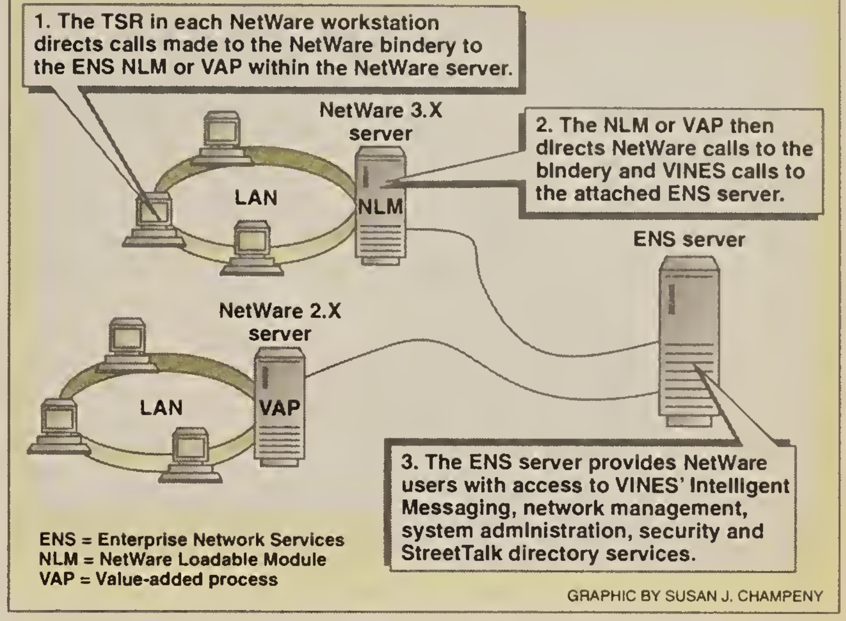
NetCensus scans network servers and takes advantage of network-specific services. For example, when NetCensus automatically learns it is being used on a VINES network, it can use StreetTalk to capture network names and addresses.

Inventories can be performed in batch mode or user-by-user. Using pull-down menus, network managers can customize the amount and types of information collected.

NetCensus also offers an optional database Consolidator utility that lets LAN supervisors at re-

(continued on page 12)

Integrating NetWare and VINES with ENS


1. The TSR in each NetWare workstation directs calls made to the NetWare bindery to the ENS NLM or VAP within the NetWare server.
NetWare 3.X server
LAN
NLM
2. The NLM or VAP then directs NetWare calls to the bindery and VINES calls to the attached ENS server.
ENS server
NetWare 2.X server
LAN
VAP
3. The ENS server provides NetWare users with access to VINES' Intelligent Messaging, network management, system administration, security and StreetTalk directory services.
ENS = Enterprise Network Services
NLM = NetWare Loadable Module
VAP = Value-added process

GRAPHIC BY SUSAN J. CHAMPENY

Beta users give two thumbs up to ENS

All agree that management is key benefit to new Banyan product for integrating VINES, NetWare.

By Caryn Gillooly
Senior Editor

Although not necessarily rare, it is refreshing to hear from users that a product delivers what the vendor promised. Case in point: Banyan Systems, Inc.'s Enterprise Network Services (ENS).

Announced in September, ENS helps users integrate Banyan VINES and Novell, Inc. NetWare environments ("Banyan to tie NetWare up with VINES," *NW*, Sept. 14). Through a VINES server attached to as many as eight NetWare 2.X, 3.X and, ultimately, 4.X servers, the current version of ENS lets NetWare users access VINES StreetTalk directory services, as well as Intelligent Messaging, network management, system administration and security services.

ENS allows users on the different LANs exchange electronic mail and lets administrators manage both environments using VINES-based network management utilities. Banyan has also promised to provide file and print capabilities across environments.

Even without the file and print capabilities, beta users agree ENS is just what the doctor ordered.

"One portion of our company [uses] NetWare, while another portion uses VINES. So we had two large portions of the company that couldn't talk," said Cindy Navarrete, technical support analyst at ENSERCH Exploration, Inc., an oil and gas exploration company based in Dallas. "Before ENS, we had a vast network of fax machines — as many as eight fax machines on each floor — and we'd just fax each other things."

With ENS in place, employees on both nets are using VINES E-mail services to exchange messages, she said. And because the NetWare users are now connected to the VINES StreetTalk directory services, those users can access resources on multiple servers with a single logon.

Other users of ENS also laud the product. "ENS gives NetWare users access to things Banyan is good at, like E-mail, security and wide-area connectivity, and will give Banyan users things Novell is good at, like file and print," said Andre Malarcher, network systems engineer at Integrators of Enterprise Solutions, Inc., a system integrator based in Akron, Ohio.

Although cross-network connectivity is certainly a priority for users with both VINES and Novell networks, beta users agreed that by far the most useful capability provided by ENS is centralized management.

ENSERCH uses four VINES servers supporting a total of about 200 users and four NetWare servers supporting a total of about 50 people, all scattered throughout various offices in Texas.

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HP covers server mart with models

continued from page 11

NCR with a 7550 machine with eight Intel [Corp.] processors," he said.

Further, HP claimed that the new high-end HP servers run three times faster than the highest performing IBM Application System/400 servers, 70% faster than the highest performing Sun server and 53% faster than IBM's RISC System/6000.

For example, HP said the IBM RS/6000 Model 560 performed 72 transactions per second performing the Transaction Processing Council's A test routines (tpsA) at $12,318 per tpsA, compared to the HP 9000 Model H40, which performed 110.4 tpsA at $8,897 per tpsA.

"We view these servers as very strategic and critical," said Willem Roelandts, vice-president and general manager of HP's Computer Systems Organization. "In the design of these systems, we have tried to focus on key customer needs and make sure that they are fulfilled."

The new servers are available now and cost between $11,250 and $103,000.

Beta users give two thumbs up to ENS

continued from page 11

Because the company was primarily a Banyan shop, ENSERCH chose to outsource a majority of the management chores for the NetWare networks. In-house administrators, Navarrete said, would do basic troubleshooting and would add users when necessary. But for network installation and larger problems, outside help was called. Staff administrators used Novell's different utilities to perform different management tasks on the NetWare LANs, which, Navarrete said, was not easy to begin with. "With NetWare, separate utilities are on separate screens," she said.

And, she added, all the NetWare LANs had to be managed separately. For example, if a new user was added to the network and needed access to all NetWare servers, each NetWare bindery had to be updated.

ENSERCH was spending upwards of $150 per hour for outsourced services, in addition to its in-house costs. But with ENS, the company's management picture — and costs — have changed dramatically. ENS lets the company manage both the VINES and NetWare local-area networks through VINES' administration and management utilities. VINES' management utilities let the administrator do almost anything from setting up new user accounts and access rights to configuring a new net from one location.

"The bottom line is, we don't have to outsource anymore because [with ENS] management is easier," she said. "We've stopped outsourcing completely."

Navarrete also said that before installing ENS, management was so difficult and costly ENSERCH did not install new versions of either NetWare or its Lotus Develpment Corp. Notes package.

"We had a NetWare network that was installed before NetWare 3.X came out that was set up with automatic logins, and nothing has been changed," she said. "We've even been using [an older version] of Notes because we didn't want to spend the money to have someone come in and upgrade the network."

According to Malarcher, Integrators of Enterprise Solutions also has gotten the most benefit from ENS's management capabilities, although his firm hasn't seen cost savings as big as ENSERCH.

"The money we saved here on administration time is low because we have a relatively small installation" of about 40 nodes, divided over five sites, he said.

"But if you have several hundred people on a dozen servers, one person can't handle the management without ENS," he added. "The more servers and more users you have, the more you will see cost savings in administration time."

Tally unveils net inventory pack

continued from page 11

mote sites maintain their own inventory databases while feeding data into a central database at user-defined intervals. In addition, the product offers the ability to customize scans in order to recognize user-developed applications.

Cecere said the company will unveil a Windows version of the software, as well as support for Apple Computer, Inc.'s Macintoshes, in the spring. He also said NetCensus will support Digital Equipment Corp.'s PathWorks and the License Services Application Program Interface in future versions but declined to say when.

Tally is also considering a version of NetCensus that will run on Hewlett-Packard Co.'s OpenView network management platform.

Available Feb. 1, NetCensus costs $149 for a five-user package and $1,575 for a 100-user version.

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INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

"IBM's NetView is a control freak, so we need to provide users with the tools that emulate [NetView's] control over SNA devices even as they migrate to a new LAN internetwork."

Paul Toldalagi
Vice-president of
Internetworking Development
Proteon, Inc.
Westborough, Mass.

Link Notes

As expected, a spate of internetworking vendors last week jointly announced with **Apple Computer, Inc.** the formation of the AppleTalk Networking Forum (ANF) whose aim it is to make AppleTalk a more robust protocol for enterprise nets ("Consortium to shape fate of AppleTalk," *NW*, Nov. 16).

The ANF will also work to advance AppleTalk internetworking by promoting interoperability among various vendors' implementations of the protocol. Those interested in joining may call ANF headquarters at (415) 966-5055.

Hughes LAN Systems, Inc. has reached a licensing agreement with Digital Equipment Corp. for DEC's Local Area Transport protocol, which will be supported on Hughes' Linc/Term and Enterprise Hub terminal server products as well as its ProLinc multiprotocol connectivity software package.

Hughes also announced it reduced the price of its 416R/T terminal server hub module by $200 to $3,695. For more details, call Hughes at (800) 395-5267. ◼

Chipcom offers token-ring bridge for intelligent hub

Device to take advantage of ONline's multiple rings.

By Skip MacAskill
Staff Writer

SOUTHBOROUGH, Mass. — Chipcom Corp. last week rolled out new token-ring bridge modules for its ONline System Concentrator intelligent hub that offer IBM and SNMP management options as well as a high level of fault tolerance.

The new ONline Token-Ring Bridge Module is a single-port token ring-to-token ring bridge that takes up one slot in either the six- or 17-slot ONline hub.

The bridge supports an unshielded or shielded twisted-pair connection to a token-ring local-area network, allowing users to connect and switch between any of the seven internal token rings the ONline supports.

The module is available in a source route bridging (SRB) version and a source routing transparent (SRT) version, both of which can operate at 4M or 16M bit/sec.

Since the bridge is fully integrated into the ONline hub, it can take advantage of the hub's fault-tolerant features, including redundant power supplies, backup links and fault-tolerant controller modules. As a result, the modules offer a high level of reliability and performance, according to Chipcom.

For example, as many as 100 token-ring users can access two redundant, parallel token-ring backbones from a single 17-slot hub, with source routing providing automatic traffic load balancing between the two backbones.

The new modules include management options for both IBM and multiprotocol network environments. The bridges contain their own Simple Network Management Protocol agent, enabling them to be managed by any third-party SNMP net management platform, including Chipcom's ONdemand Network Control System (NCS) network management system.

With ONdemand NCS, network administrators can switch the bridge modules between any of the seven token rings in the hub.

For users with IBM Token-Ring environments, the bridge

(continued on page 14)

3Com pens deal with Sync Research for SNA solutions

By Maureen Molloy
Senior Writer

SANTA CLARA, Calif. — 3Com Corp. and Sync Research last week announced a joint marketing agreement whereby 3Com will recommend Sync's SNA conversion gateways as part of the router vendor's SNA internetworking offering.

The relationship lets 3Com reference sell Sync Research's IBM Synchronous Data Link Control to 802.2 Logical Link Control 2 (LLC2) conversion product, enabling 3Com to offer its customers a complete line of products for their Systems Network Architecture internetworking requirements ("Netlink and Sync Research enhance their SNA gateways," *NW*, Oct. 26).

Sync's products reduce transmission costs by enabling users to add IBM SDLC data to multiprotocol internet backbones by converting that data to LLC2 packets. The products are the SNA Network Access Controller/Token Ring Converter (SNAC/TRC) and mini-SNAC, which is a board level version of the SNAC/TRC that fits into devices such as hubs, routers and T-1 multiplexers.

The SNAC/TRC attaches to token-ring LANs and supports SDLC links to devices such as cluster controllers.

The devices strip SDLC headers off incoming data packets and replaces them with LLC2 headers, allowing the traffic to be handled on the ring and over the backbone.

Edgar Masri, 3Com's director of business development, said the user would employ the SNAC/TRC in conjunction with 3Com's routers to perform SDLC-to-LLC2 conversion. Using conversion devices to front-end the router has

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PHOTO ©1992 JOHN THOMPSON

Yoseph Linde of LANart Corp.

Chipcom founder to begin new challenge

Linde will bring his Midas touch to LANart as well as the low end of internetworking market.

Yoseph Linde founded Chipcom Corp. in 1983, and since then has played a major role in the company's successful assault on the intelligent hub market.

But Linde recently gave up the majority of his responsibilities at Chipcom to become president and chief executive officer of LANart Corp., a division of Chipcom that was spun out as an independent company. LANart manufactures a wide range of low-end products, such as transceivers, repeaters and work group hubs, that are based on its application-specific integrated circuit (ASIC) technology. The company began shipping products last month.

Linde recently spoke with *Network World* Staff Writer Skip MacAskill to explain why he wanted to start over from square one and how he was positioning LANart in a crowded field.

How did LANart get started?

LANart started as a division of Chipcom about a year and a half ago. The idea was to get the high end-focused Chipcom into the low-end or mainstream networking market in a more serious way.

We found, however, that it was difficult to have these two types of businesses under one roof because it was a bit defocusing. We decided it would be best to spin LANart out as an independent company and still maintain strong ties to Chipcom.

Breaking off from Chipcom at the height of a recession was a bold move. What factors came into play in that decision?

First, I really didn't break out of Chipcom. I'm still chairman of the board of Chipcom as well as a stockholder. Second, I think the best time to start a company is in a recession because it's easier to hire good people and raise money since you have less competition from other businesses trying to start up.

Venture capitalists that make those investments are not looking a year or two down the road. They have a time scale of five to 10 years. They understand that the recession will be over, and it is a good time to invest in a company that has a vision of the future. It also helped us in terms of getting good engineers.

What was your personal motivation for the move?

Chipcom got to the size and point of complexity where they didn't need me. I didn't feel that I was making as many contributions as I used to. Besides, I like the small company environment where you know everybody, can make contributions and see quick results. I felt I could start up a company once more and have some fun, as well.

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Chipcom offers bridge for hub

continued from page 13

module can also be managed via IBM's LAN Network Manager. In addition, administrators can monitor and control the bridges through a terminal directly connected to a serial port on the module.

Administrators can easily upgrade the bridge module with new functions and enhancements by downloading software using the module's flash erasable programmable read-only memory feature, which also stores configuration information in the event of a power failure.

The ONline Token Ring SRB Module costs $5,495, and the SRT version is priced at $6,895. Both products will be available in 60 days. An SRB-to-SRT upgrade will also be available within the same time period and will cost $1,995.

Vendors enhance TCP/IP wares

continued from page 5

client and server] together. We took the Unix workstation approach and bundled them together."

Version 3.1 also features load balancing, which helps maintain CPU efficiency by distributing incoming connection requests equally among OpenVMS cluster nodes, and a failover capability that allows one node in the OpenVMS cluster to take over a connection request if the target node fails.

Pricing for TCPware 3.1 for OpenVMS starts at $1,195. It will be available in January.

TGV, meanwhile, unwrapped MultiNet Version 3.2, which includes support for Novell, Inc.'s Internetwork Packet Exchange (IPX) protocol, load balancing and improved print services.

IPX support allows MultiNet application developers to use NetWare protocols instead of TCP/IP when building applications for NetWare clients that reside on DEC VAX platforms, TGV said. It also presages a new MultiNet product that supports NetWare file and print services on VAX platforms, the firm said.

The load-balancing feature works a lot like the load-balancing feature of Process Software's TCPware. MultiNet 3.2 evenly distributes network requests across all nodes in the cluster to maximize CPU efficiency.

New print services in MultiNet 3.2 include access to local OpenVMS print queues for remote users, enabling them to print jobs at a central site as if they are located at that site. Also, OpenVMS users can use native OpenVMS commands to print to remote machines, TGV said.

MultiNet 3.2 costs between $1,100 and $24,000. It, too, will be available in January.

Firms report APPC success

continued from page 5

"Because our business changes so rapidly, we expect every application we write today to be obsolete in six months," he said. "So we need to have the next application ready very quickly."

Mobil has a VM mainframe with about 140 users linked through a Token-Ring LAN and communicating via LU 6.2. The firm migrated from a 3270 environment, where it shared an IBM MVS mainframe with its parent company, Mobil Oil Corp.

When users were linked to the MVS mainframe, response times would fluctuate from three seconds to 25 minutes.

The company had specific goals for its net development that APPC/LU 6.2 met, he noted. The net had to be scalable and handle distributed applications. The architecture also had to support rapid application development and utilize the power of the firm's desktop PCs. "APPC gave us usable applications quickly," Parker said. "And it didn't take rocket science to get it done."

3Com pens deal with Sync

continued from page 13

performance advantages over other approaches such as building conversion capabilities into the router. That is because the router is not required to handle SDLC traffic in addition to its LAN traffic, which can compromise its performance.

The relationship with Sync rounds out the second phase of 3Com's SNA strategy that was outlined in the spring ("3Com lays plan to weave SNA data in internetworks," *NW,* March 16). The vendor currently offers token-ring bridging and routing and provides LLC2-to-Transmission Control Protocol/Internet Protocol encapsulation.

The vendor also said that, by the second half of next year, it will support native SNA routing via IBM's Advanced Peer-to-Peer Networking (APPN). It has already licensed IBM's APPN network node.

For more information, contact 3Com at (800) 638-3266.

Founder to begin new challenge

continued from page 13

What is LANart's current relationship with Chipcom?

Basically, Chipcom transferred to LANart the technology that was developed in the LANart division in addition to the engineers that were working on LANart projects. Chipcom will also retain rights to those products. We do have some ongoing joint developments, and Chipcom owns a 10% to 20% stake in LANart. In addition, there is an agreement between the companies that defines their markets. This means we're not going to compete with Chipcom in the high-end intelligent hub market, and they won't compete with us at the low end.

What is LANart's mission?

LANart's mission is really to become the leading company in the mainstream networking market. Defining that market is a moving target that is a function of time. Things that were high end five years ago are mainstream now. There are products, such as stand-alone hubs, transceivers, repeaters and low-end bridges, that constitute a large market opportunity. What we have found — and it has surprised us — is that there really isn't an established leader in this market. No one has a 30% or 40% market share, which means there's still room.

Some would argue that a lot of the products at the low end are commodities, so how does LANart make its presence felt?

The key for LANart is to be able to differentiate our products. We don't want to have strictly me-too kinds of products. To avoid that, we have to add functionality. The other key is cost. You can't add functionality and increase pricing. By basing a great majority of our products on our ASIC designs, we can offer great functionality and pricing because it's homegrown.

> "A start-up's goal is to find situations where the common wisdom is wrong."
>
> ▲▲▲

What is LANart's strategy?

Our strategy is to wait for the markets to come to us, which means that we must be able to move as the mainstream market moves. Basically, we wait until markets are developed and then come in with products that do a much better job. Improving something is a different type of challenge, and, in some ways, it's much more difficult.

What are the keys to success?

For a start-up to be successful, it has to do things differently. For a start-up, there is no advantage in being right because it's not enough. A start-up's goal is to find situations where the conventional wisdom is wrong, to look for places where other companies don't want to be. Most times, when the common wisdom was wrong, it was for a good reason, but sometimes you find a few gems that were overlooked.

Single-system mgmt. out of grace

continued from page 5

The market for MOMs — which includes the Integrator, Nynex Corp.'s Allink and systems from Boole & Babbage, Inc., Applied Computing Devices, Inc. and MAXM Systems Corp. — is $65 million this year, according to Northern Business Information (NBI), a research firm in New York.

NBI considers IBM's NetView to be a Systems Network Architecture element management system, while Digital Equipment Corp.'s DECmcc Director, Hewlett-Packard Co.'s OpenView and Sun Microsystems, Inc.'s SunNet Manager are "integrated" managers.

The market will reach $80 million by 1995, assuming AT&T keeps the Integrator on the market, NBI says. AT&T said it is looking at lower priced, standards-compliant products as potential alternatives to the Integrator.

Systems such as Concert and the Integrator attempt to perform fault, configuration, performance accounting and security management of every device in the network, analysts say. They collect alarms from element management systems and, working through those products, perform remedial action on faulty devices.

But delivering on that promise is proving futile.

"There is no way that even IBM or AT&T can possibly build all of the requisite functionality" necessary for managing every element manager and device in an enterprise network, said David Passmore of Gartner Group, Inc. in Stamford, Conn.

"The whole manager-of-managers concept that once sounded so appealing is basically bankrupt," he said.

Unlike NBI, Passmore regards IBM's NetView as a MOM. IBM has realized some success with NetView because it has been on the market for six years and is well entrenched in the enormous installed base of SNA networks. Still, NetView is an expensive mainframe software product that provides limited support for non-IBM gear, Passmore says.

Some users are resigned to using several separate element managers to govern the subnetworks that make up their enterprise net. Because each element manager is specific to certain network devices and subnetworks, they collectively provide more comprehensive management of the enterprise.

If users do deploy a MOM, it serves to collect and display alarms from the element managers, such as IBM's NetView configured with NetView/PC, rather than to perform fault, performance or configuration management of the network elements themselves.

"We always relied more on the element management systems [for troubleshooting] and used the Integrator as the first indicator [of trouble]," said Les Wright, manager of corporate networking and network applications at General Dynamics Corp. in Fort Worth, Texas. "I'm not sold on the concept of a manager of managers."

Move to platforms

Those who are not sold on the MOM concept but still desire integrated net management are opting for the management integration platform approach espoused by HP and Sun, Passmore said.

Dennis Biedrzycki, a product marketing manager in DEC's software group, agrees. "The industry has consolidated around a smaller set of management systems taking the role of integrated platforms," he said.

Management integration platforms, such as OpenView and SunNet Manager, include a basic set of management services, such as device discovery and mapping, as well as alarm correlation and filtering.

They support standards such as Unix, the Simple Network Management Protocol and the Open Software Foundation, Inc.'s Distributed Management Environment. In addition, they include application program interfaces so that software developers can write applications tailored for specific network elements or subnetworks.

GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

> "In the early 1980s, the telecom industry thought that the PBX would become the office controller. It's obvious now that the dream will never be fulfilled."
>
> **Anthony Tissot**
> Group manager
> System management, networks
> Rolm
> Santa Clara, Calif.

Regulatory Update

The **Federal Communications Commission** last week set up an advisory committee to provide it with expert advice and recommendations on matters pertaining to the establishment and regulation of mobile satellite service in the 1,610- to 1,626.5-MHz and 2,483- to 2,500-MHz bands.

These are the frequencies the FCC has proposed to allocate for technologies such as low-orbit satellite systems that would enable consumers to use hand-held voice/data terminals.

The MSS Above 1-GHz Negotiated Rulemaking Committee will hold its first meeting at 9:30 a.m. Jan. 6 at the FCC building. Eleven subsequent meetings are scheduled through March 1993.

Those applying for use of the bands, existing users of the frequency bands and other interested parties are asked to attend to discuss and recommend approaches to resolve technical sharing and coordination issues for the new satellite service.

For further information, contact Kathleen Campbell, administrative assistant for the committee, at (202) 634-1952.

FCC opens spectrum for new CellularVision offering

Enables operators to offer new consumer services.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — The Federal Communications Commission has endorsed nationwide use of a microwave communications technology that will enable businesses to deliver a wide array of information services to consumers.

CellularVision, the firm that developed the technology, said the offering will represent a lower cost alternative to cable television and fiber optics for delivery of voice, data and video services.

Last year, CellularVision asked the FCC to reallocate radio frequencies in the 28-GHz spectrum — high frequencies long considered to be too unstable for this type of application. Those frequencies would be used by operators to deliver multichannel television and a range of offerings including video on demand, multimedia and other interactive services such as home shopping and home banking.

The validity of the technology is being demonstrated in Brighton Beach, N.Y., where subscribers have been receiving CATV since last summer under a special license issued by the FCC in January 1991.

> The validity of the technology is being demonstrated in Brighton Beach, N.Y.
>
> ▲▲▲

How it works

Subscribers can access as many as 49 channels of CATV, which is delivered from a centrally located transmitter that serves a surrounding cell measuring ap-

(continued on page 16)

AT&T launches new Skynet int'l satellite data service

MORRISTOWN, N.J. — AT&T has broadened its Skynet line of satellite services by announcing an international service that supports rates of 56K to 2.048M bit/sec to sites throughout South America and Africa.

The offering, dubbed Skynet International Direct, is a two-way C-band service provided from existing AT&T satellite earth station gateways in conjunction with foreign carriers that provide the service.

AT&T said Skynet International Direct will give users a higher bandwidth, less expensive alternative to services provided over undersea fiber cables. The service can also reach remote sites in each country.

The carrier initially plans to roll out the service in 75 countries.

"We think this service will be especially attractive to multinationals in countries where the network infrastructure is largely or totally analog," said Lucius Brooker, group product manager for Skynet International. "High-speed digital [links] are a step up from what's offered now."

With Skynet International Direct, customers linked to the gateways via land lines can use C-band earth stations ranging in size from 3.5 to 9 meters in diameter, depending on the bandwidth needed.

Service and support

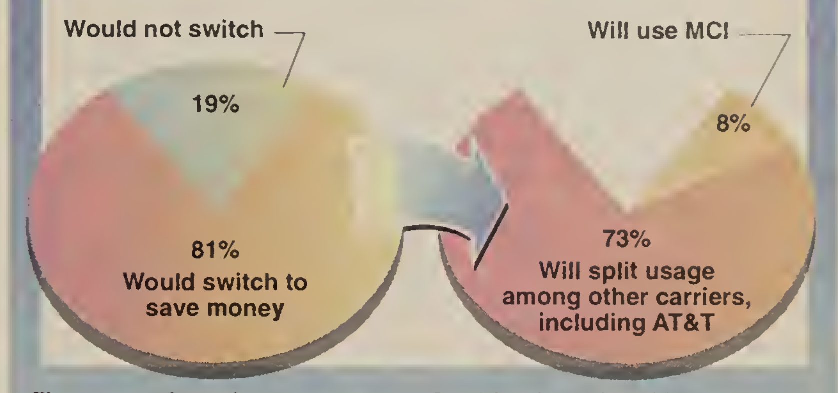
AT&T has set up cooperative agreements with two equipment vendors — Vitacom Corp. of California and Scientific-Atlanta, Inc. of Georgia, both of which will work with AT&T to offer multinational firms satellite equipment and support services.

The vendors are responsible for supplying, installing and coordinating maintenance of users' dedicated satellite earth stations. They have tailored the design and operation of their earth stations to AT&T requirements.

(continued on page 16)

An 800 user exodus?

Would you switch to another carrier after 800 portability?



Figures are based on a survey of 538 chief financial officers of small and midsized U.S. firms.

GRAPHIC BY TERRI MITCHELL

SOURCE: TELE CHOICE CONSULTING, INC., MARIETTA, GA.

MCI may win big after 800 portability

Survey results show that most chief financial officers would switch from AT&T to save money.

By Bob Wallace
Senior Editor

MARIETTA, Ga. — A survey of 538 chief financial officers (CFO) at small and midsize firms predicts MCI Communications Corp. will walk away with the lion's share of the toll-free 800 service business when 800 portability arrives.

The survey, conducted by Tele Choice Consulting, Inc., based here, shows that users are highly cost-conscious. Roughly 81% of the respondents said they would "very likely" switch carriers by late 1993 if they can reduce costs.

Of the 81% who said they would switch, roughly nine out of every 10 said they would switch from AT&T to MCI, with the rest staying with AT&T but giving some traffic to Sprint Corp. and several other carriers.

Jeffrey Kagan, president of Tele Choice, said most of the companies surveyed use a variety of carriers but the majority rely on AT&T for most of their 800 service.

Explaining why MCI showed so well as a likely alternative to AT&T, Kagan said, users "would first switch to the next biggest carrier to make sure nothing goes wrong. Then they would consider other carriers."

But carrier tactics such as offering discounts and rate reductions to retain existing 800 users and win new customers may stem the flow to other carriers. As a result, many of the CFOs surveyed who said they would switch to save money may stay with their current carrier, Kagan said.

All of the Big Three have announced discounts, rate cuts or advanced 800 routing features and other offerings in an effort to lock in existing toll-free customers as 800 portability — slated for May, 1993 — approaches.

> Portability promises to loosen AT&T's stranglehold on the toll-free services market.
>
> ▲▲▲

Promise of portability

Today, 800 numbers are assigned to specific carriers, meaning customers have to give up their numbers if they change carriers. With portability, database technology being implemented by local carriers will allow customers to use the same 800 number with any long-distance carrier.

Portability promises to loosen AT&T's stranglehold on the toll-free services market, which it created in 1967. The carrier currently holds more than 80% of the $7 billion 800 market, according to the Federal Communications Commission.

(continued on page 16)

AT&T launches int'l satellite data service

continued from page 15

AT&T also offers a satellite-based end-to-end digital service internationally using very small aperature terminals through its AT&T Tridom division. The multipoint service supports speeds of up to 64K bit/sec to sites in the U.S. and Canada.

Waiting for authorization

The carrier said its Skynet International Direct can be installed after final authorization from the foreign telecommunications administration that handles the area in which the service is requested.

In many cases, optional consolidated billing arrangements are also available, which will enable users to combine international and local charges for volume discounts, according to AT&T.

The carrier also said the service carries a flat monthly rate, which includes the cost of the gateway to the distant-end segment of the link. AT&T said the cost of the earth stations used with Skynet International Direct range from $65,000 to $600,000. ◻

MCI may win big after 800 portability

continued from page 15

Of the 81% of the CFO respondents who said they would change 800-service providers if it saved them money — most of whom are currently AT&T customers — 90% said they would switch to MCI, while 10% said they would split their toll-free traffic among other carriers.

Although survey results show that most 800 users would switch if they could save money, they would not change carriers overnight. In fact, fewer than 25% of those who would switch said they would do it right after portability comes into being in May. The remaining 75% told Tele Choice they would wait several months to make sure everything works before changing 800 carriers.

This should come as no surprise since users were the chief advocates behind the FCC's November decision to delay the date for 800 portability. The 800 portability issue is plagued by problems and questions that must be resolved by the FCC and carriers before portability becomes a reality.

User concerns

Among other things, there are concerns about the vital Signaling System 7 links among local and long-haul carriers and confusion about backup plans if the new 800 database technology fails ("Nagging questions tarnish allure of 800 portability," *NW*, Nov. 30).

> Fewer than 25% of those who would switch said they would do it right after portability comes into being in May.
>
> ▲▲▲

Although most of the survey respondents at the small and midsize firms — 85% — said they would be lured by potential savings, they listed other reasons they might change.

For example, 8% said they don't like their current 800 carrier, 5% said they would also seek advanced toll-free service features and 2% had other reasons. ◻

FCC opens spectrum for new offering

continued from page 15

proximately 28.5 square miles. The cells are linked across an operating territory via point-to-point transmitters, such those used in cellular telephone networks.

Residences receive the signal through windowsill-mounted, flat, digital panel antennas measuring 6½ square inches, which are connected by coaxial cable to a AM/FM converter on a television set.

Adjoining cells in a network using the CellularVision technology would be oriented along a horizontal or vertical axis, a polarization technique that allows signals of the same frequency to be used without causing interference.

What's new

The technology calls for use of frequency modulation — vs. the amplitude modulation used with CATV, which is more susceptible to distortion — and signals at higher frequencies than typical UHF and VHF.

In addition to television services, CellularVision technology also permits reuse of the spectrum for full-duplex, narrow and broadband communications, including telephony, videophone and multimedia services. ◻

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Worth Noting

"Corporate developers can forget about the messaging [application program interface] wars because they will be using forms routing software to develop mail-enabled applications most of the time. When they do use mail APIs, it'll just be simple file, send and receive commands anyway."

David Ferris
President
Ferris Networks
San Francisco

Store & Forward

Microsoft Corp. and **Ingres Corp.** have announced they will work together to develop software that will enable Microsoft Windows-based applications to access Ingres databases.

The two firms will develop Open Database Connectivity drivers for Ingres Intelligent Databases, Ingres/Star Distributed Databases and Ingres/Gateways to other databases. The drivers will be ready by early next year.

Gupta Corp. has announced it is working with **Information Builders, Inc. (IBI)** and **Terrace Systems** to link Gupta's client/server tools, SQLWindows and Quest, to IBI's Enterprise Data Access (EDA)/SQL connectivity software. The companies are building a new tool, called SQLRouter for EDA/SQL, that will enable SQLWindows and Quest applications to access

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New ware offers access to object, relational databases

UniSQL offers object-oriented data access tool.

By Wayne Eckerson
Senior Editor

CHICAGO — UniSQL, Inc. has announced an SQL-based data access tool that allows users to read and write data from both relational and object-oriented databases.

UniSQL also unveiled a new fourth-generation language, called UniSQL/4GE, that enables developers to build applications that work with the Austin, Texas-based company's UniSQL/X database, which combines elements of relational and object-oriented database management systems.

The announcements were made at the recent Database World Conference & Exposition here.

The new data access tool, called UniSQL/M Multidatabase System, allows users to build a single, homogeneous view of multiple relational and object-oriented databases. The system, which runs on Unix workstations, lets users access data using SQL/M, UniSQL's object-oriented query language.

The tool preserves users' investments in SQL access methods while providing them with a way to integrate data from relational and object-oriented databases. It lets users access multiple relational databases or a combination of relational and object databases as if they were part of a single distributed system.

UniSQL/M Multidatabase Systems provide an application program interface that lets users integrate data models from various databases into a single, unified multidatabase system. This integrated multidatabase is based on the same unified relational and object-oriented data model as UniSQL's UniSQL/X DBMS.

This model allows the UniSQL/M Multidatabase System to imbue relational data with object-oriented capabilities such as classes, methods, inheritance and encapsulation. But it also

(continued on page 18)

Software AG unveils tools for distributed client/server

By Wayne Eckerson
Senior Editor

RESTON, Va. — Software AG of North America, Inc. last week delivered a suite of software products designed to help companies build distributed client/server applications.

The firm unveiled an OS/2 version of its flagship database management system, a middleware product and a client/server application development tool.

Software AG's Adaptable Database System (ADABAS) Server, which runs on OS/2, contains many of the same capabilities as the firm's ADABAS DBMS, which runs on IBM mainframes, Digital Equipment Corp. VAX/VMS processors and Unix servers. ADABAS Server supports high-volume on-line transaction processing and supports the firm's Entire Transaction Propagator, which provides replication services.

The Entire Network for OS/2 is middleware that enables developers to build distributed applications without worrying about underlying communications protocols. Entire Network currently supports Novell, Inc.'s Sequenced Packet Exchange protocol, IBM's Network Basic I/O System and LU 6.2 protocols. It will support Transmission Control Protocol/Internet Protocol and DEC's DECnet protocols by the end of the month.

Also shipping is a new release of Natural, a fourth-generation language development tool for building client/server applications. Release 1.1.4 supports ADABAS Server for OS/2 and allows developers to employ standard SQL syntax.

The ADABAS Server for OS/2 costs $500 for a single-user license and $67,000 for 256 users. Entire Network for OS/2 costs $300 per node. Natural for OS/2 costs $1,250 for a single-user license and $300 for a single-user run-time license. All products are available now.

Hewlett-Packard Co.'s Willem Roelandts

HP exec details role of object technology

Roelandts explains how object technology works along with its contribution to applications creation.

By Timothy O'Brien
West Coast Bureau Chief

Although object-oriented technology is hailed as the future of software development, few information systems executives really understand how object technology will be supported by, and affect, the enterprise net.

In an interview with West Coast Bureau Chief Timothy O'Brien, Willem Roelandts, vice-president and general manager of Hewlett-Packard Co.'s Computer Systems Organization, took time out to explain the role object technology will play in the development of a new generation of network applications.

At the forefront of object technology since 1981, HP was one of the companies instrumental in forming the Object Management Group (OMG), an industry consortium established in 1989 to set object standards. HP now markets 13 object-based software products.

Objects are also at the core of HP's distributed computing environment, which is designed to give users access to information and computing resources across multivendor networks.

Roelandts will be giving a keynote speech titled "The Object World That Awaits You" at the upcoming Object World conference in Boston on Feb. 2 at 10:15 a.m.

While object-oriented technology is certainly a hot topic, many IS executives I speak to don't know much about how this technology will impact networks. What's your view?

Object technology is a way of reducing complexity. For the network manager, this is really the whole problem of network management — especially when you move beyond the work group.

Objects are really self-contained software elements consisting of programs and data. As a result of the instructions contained within the objects, such as the location or access method of the device, object technology can reduce the complexity of managing hundreds or thousands of network components.

Object technology does to computing what packet switching does to networking. In circuit switching, you have some kind of a database that tells you where you set up and then you have this connection. But you also have to go to an independent database on the network that does the management for you.

Packet switching is different because the data and the addresses are all contained in a single, independent packet. The only thing a packet needs to know is how to get to the next node. In packet switching, there is not the complexity of a central database that has to set up all the routes for the communication. As a matter of fact, in packet switching, the packet can be rerouted on the fly.

How successful do you believe the OMG will be in setting standards for the use of

(continued on page 18)

Role of object technology

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objects in heterogeneous network environments?

First of all, there are going to be multiple object standards because people are going to want to do multiple things. As software is used at higher levels of abstraction, the more you need to specialize. There will be multiple classes of objects that will be used. That is unavoidable.

The idea that we will have this single object model just doesn't hold ground. You cannot do that. For instance, there is not a single fourth-generation language. When you move from a third-generation language to a fourth-generation language, it is going to a higher level of abstraction or specialization. But it also limits what you can do. Therefore, you need different [fourth-generation languages] to accomplish specific tasks.

With objects, it will be the same thing. The main focus of the OMG is on standards — defining how objects interact and how you can get to them. That's why the Object Request Broker for the interface is a pretty good description. [The Object Request Broker is software that facilitates the interaction of objects over a network.]

> ‘‘The advantage of object technology is that it will eventually eliminate programmers.

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Also, keep in mind that OMG's focus is on distributed objects. Objects have been around for a while, but they have usually been used within the constraints of a single machine. As an example, in our NewWave program, objects were used to paint the screen.

OMG's work with the Object Request Broker is geared toward users that have networks made up of clients and servers.

I believe OMG's [Common Object Request Broker Architecture] specification will be one of the main standards in distributed object technology for two reasons. First, there are over several hundred companies that support COBRA. Second, COBRA is there; the fact that it is a standard that people are using today dwarfs any potential shortcomings it may possess.

How do you see companies that have much of their corporate data stored in relational databases making the move to object technology? Will it be a slow migration or will hybrid technologies evolve like your OpenODB database product has?

I think you have put your finger on the big issue. There are two schools of thought in the object-oriented database world.

The first approach is one that we at HP have started, which builds an object layer on top of a data manager that is also used for storing relational data. You have a tremendous advantage there due to the migration path.

Relational or flat-file network databases only store structured data. It could be text or numbers but it needs to have a fixed format. With object databases, it is possible to store objects of any size, which expands the type of data that can be used. You are no longer limited to text and numbers, and it is also possible to retrieve this information very quickly.

By building an object layer on top of the existing infrastructure surrounding the relational model, it is also possible to take advantage of the work that has been done in distributed computing, such as two-phase commit.

The other school of thought is to start from scratch and build an object database, which is what many smaller, start-up companies are doing. You certainly have an advantage in performance, but you have to be careful with that appraisal because many times these databases are geared for the technical user working at a single workstation.

My belief is that both types will exist. At HP, we're considering the possibility of offering the best of both worlds. We're looking at optimizing OpenODB for a single user system — taking integrity, error checking and multithreading out of the server to gain the same performance levels as the single user systems. Some of our technical people internally who have looked at OpenODB believe we can do it.

As programs grow in complexity from thousands of lines of code to millions of lines, many predict that conventional programming techniques will no longer be adequate and that object-oriented programming will be required to meet this demand. Others say object technology will be as important to the industry as the introduction of the personal computer.

Do you see the impact of object technology as being this dramatic?

In terms of software, much of what is said about the importance of object technology is true. There is no doubt that programming complexity increases faster than programming productivity. Twenty years ago, it took 20 engineers to write an operating system; now it takes 200 engineers.

But the real advantage of object technology is that it will eventually eliminate programmers. In other words, object technology has the potential for end users to do their own application development. And that is where the real breakthrough will come.

> Object technologies in the future will insulate the user from needing to write lines of code.

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Instead of saying, 'Let's increase programmers productivity,' I'm saying you won't need programmers anymore. Within certain limits, of course; for operating systems, you will always need programmers. But let me use an analogy that illustrates this point.

Today, an accountant can build pretty complex spreadsheets. If this person wanted to do the same thing with a program written in C or COBOL, it would take a programmer a couple of years to do that. And everytime something would need to be changed, it would take the programmer months to make that change.

But this accountant, who knows nothing about programming, can write very complex programs because of the capabilities in the spreadsheet itself.

In the same way, object technologies in the future will insulate the user from needing to write lines of code. Instead of custom programs, the application program of the future will be a sequential execution of objects. And every object could be millions of lines of code; it wouldn't matter.

In addition, these objects won't be written in the types of languages we use today. Instead, they will be written in symbolic languages. In this way, people who have no knowledge of languages will still be able to pull these objects together into programs. There are already programs like that.

For instance, HP has introduced a very specific application for the telecommunications industry, called the Service Creation Environment. This software allows phone companies to quickly adapt and create programs that support new types of phone services.

By using objects, it is possible to create these programs in a matter of weeks. This is because all the functions of a telephone switch can essentially be boiled down to thirty objects — at least that's what one phone company did.

That is where the big advantage of object technology comes. We are not going to be there immediately; it's going to take a while. But object technology could ultimately allow people to write application programs without having to learn computer programming.

We will still have computer programmers, but they will be used to write objects. Users will then be able to take objects out of a library and use them in their work.

The other big advantage of object technology is in terms of reducing the complexity of distributed computing. Today, we are writing lines of code to define how clients will interact with servers. But how will we make it all work together?

The only way to do it is to move up in the abstraction level of the software. Instead of writing lines of code, you'll just have objects and the Object Request Broker will figure out where on the network the object should be executed. It will even do it on the fly. If your network changes, it will find the optimum solution for you.

Object technology will allow the true client/server to emerge because it is the only way we know today to reduce the complexity of managing where the various pieces of software programs will be executed on a network.

Store & Forward

continued from page 17

data on 50 databases and file structures on 35 hardware platforms. The new product will be available in 1993.

NCR Corp. has announced that **Genesis Development Corp.** of West Chester, Pa., will provide design, support and integration services to users of its Cooperation work group software.

Cooperation is a graphical work group product that provides electronic mail, systems management, software distribution, group calendaring, work flow automation, and database and host access capabilities across DOS, Windows, OS/2 and Unix platforms.

Easel Corp. introduced new scalable packaging options for its Easel Workbench and Enfin client/server application development tools.

Easel now offers SQL Editions and Corporate Editions of the two products. The SQL Editions, which consist of OS/2 and Windows versions of both products, range in price from $3,995 to $5,995. The Corporate Editions range in price from $7,900 to $10,900.

Tool provides database access

continued from page 17

supports standard database features, such as query optimization, automatic transaction management and access authorization.

However, the UniSQL/M Multidatabase System does not require users to modify underlying database systems or extract data from those systems into a central data store. Thus, the system does not impact the autonomy, availability, integrity or security of underlying databases.

The UniSQL/M system supports two-phase commit for transactions that are distributed across multiple databases. It also provides facilities for resolving semantic and structural conflicts between multiple underlying databases.

The initial version of the UniSQL/M Multidatabase System, which will be available in January, will run on Ingres Corp.'s relational database system and UniSQL's UniSQL/X database running on Sun Microsystems, Inc.'s SPARCstation. A single-user license will cost $3,995, including training.

Future versions of the UniSQL/M Multidatabase System will run on IBM's RISC System/6000 and will support Unix databases from Oracle Corp., Informix, Inc. and Sybase, Inc., IBM's DB2 and nonrelational systems, such as IBM's IMS and Digital Equipment Corp.'s RMS.

UniSQL's UniSQL/4GE is an application development tool that uses the object-oriented and multimedia capabilities provided by the UniSQL/X Database Management System.

The tool consists of the ObjectMaster Editor, which allows nontechnical users to build graphical applications, and the ObjectMaster Application Folder, which acts as a central repository for application code that may be reused, recombined or extended to build additional applications.

The UniSQL/4GE tool will be available in April on Sun SPARCstations and IBM RS/6000 machines. A single-user license costs $1,795.

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

> "There are some vendors that are committed to their proprietary products. If they could kill OSI, they would."
>
> **Jean-Philippe Favreau**
> Director of the U.S. test program
> for Government Open Systems
> Interconnection Profile
> National Institute of
> Standards and Technology
> Gaithersburg, Md.

People & Positions

Oracle Corp., a Redwood Shores, Calif., database vendor, last week appointed **George Koch** to head the firm's international sales and marketing division as senior vice-president of worldwide applications. Previously, he was senior vice-president of the firm's applications division. Oracle also named **Ronald Wohl**, formerly chief quality officer, as senior vice-president of applications development.

Fibronics International Inc., a Pembroke, Mass., internetworking and mainframe connectivity vendor, last week named **Gil Weiser** as president and chief executive officer. **John Hislop**, acting as joint CEO with **Zvi Axelrod**, will become corporate vice-president and chief financial officer following Axelrod's resignation.

Lynn Chapman, formerly director of special systems division health care markets at Data General Corp., has joined switch maker **Netrix Corp.** of Herndon, Va., as vice-president of product development. That position was held by a founder of Netrix, **Holger Opderbeck**, who has assumed the newly created position of vice-president and chief technical officer. ◪

Taking stock of network product vendors

Company	Percentage change over 12 months		
	Revenue	Earnings	Stock price
Internetworking			
Cabletron Systems, Inc.	48.2	48.0	71.2
Cisco Systems, Inc.	88.0	101.3	186.5
SynOptics Communications, Inc.	33.9	-4.4	302.3
Wellfleet Communications, Inc.	119.8	163.4	140.8
Network operating systems			
Artisoft, Inc.	72.6	124.1	-4.1
Banyan Systems, Inc.	8.7	98.8	61.0
Novell, Inc.	45.8	53.1	21.0
Databases			
Informix Software, Inc.	34.2	ND	314.1
Oracle Corp.	16.1	-62.3	58.3
Sybase, Inc.	60.7	187.4	128.4

ND = Negligible difference

SOURCE: THE FIRST BOSTON CORP., NEW YORK

Client/server deployment drives 1992 net market

Net gear, software vendors report banner year.

By Bob Brown
Senior Editor

Thanks in large part to the move by users to client/server computing, 1992 has been a very good year financially for a large group of network equipment and software vendors.

Internetworking, network operating system and database vendors recorded huge increases in revenues, earnings and stock prices this year while traditional network and system vendors, such as Digital Equipment Corp. and IBM, struggled.

> For evidence of the internetworking market's strength, just take a look at stock prices.
>
> ▲▲▲

The strong showing of network players is good news not only for investors, but also for users that will benefit from increased research and development spending on new technologies and add-on products.

Internetworking vendors are the darlings of many Wall Street analysts these days with Cabletron Systems, Inc., Cisco Systems, Inc., SynOptics Communications, Inc. and Wellfleet Communications, Inc. leading a stock price charge. Network operating system (NOS) vendors Artisoft, Inc., Banyan Systems, Inc. and Novell, Inc. also flourished, while relational database vendors Informix Software, Inc., Oracle Corp. and Sybase, Inc. had a banner year (see chart, this page).

For evidence of the internetworking market's strength, just take a look at stock prices of some leading hub, bridge and router vendors vs. those of traditional computer and network vendors. Cabletron closed Dec. 11 at 71⅞, just below its 52-week high of 75⅜, while Cisco closed at 71¾, just under its 52-week high of 76½.

DEC, on the other hand, closed at 33¼ on Dec. 11, barely over its 52-week low of 31½ and well below its 52-week high of 65½. DEC's all-time high stock price was 199½ on Oct. 6, 1987.

Internetworking vendors "are doing well because they are helping companies build the basic infrastructure for client/server computing," said Tom Erickson, a partner at Wessels, Arnold & Henderson, an investment firm in Minneapolis.

Paul Johnson, a vice-president at The First Boston Corp., an investment firm in New York, said the strong keep getting stronger in the internetworking market.

"Customers are really looking to go with the big internetworking companies for their standard purchases and only to the smaller ones for specialized stuff," he said. Bytex Corp. and other fringe players in the internetworking market have struggled, he added.

While the major NOS suppliers, such as Artisoft and Novell,

(continued on page 20)

NBC gives financial firms market info

Video-to-the-desktop offering helping money managers make sound investment decisions.

By Ellen Messmer
Senior Correspondent

NEW YORK — Money managers have started tuning into NBC's financial news reports delivered by satellite to their personal computers to get information to help them on investment decisions.

Cigna Corp., General Electric Co., Merrill Lynch & Co., Inc., State Farm Life Insurance Co., T. Rowe Price Associates and Charles Schwab & Co., Inc. are among the first dozen subscribers to NBC's Private Financial Network.

The companies gave a "buy" decision for the news service following a three-month trial in which the satellite-delivered video feed was found to integrate well into the desktop environment.

"It's quite appealing," said Carole Patrick, assistant vice-president at T. Rowe Price, a Baltimore-based investment firm with more than 1,100 traders. "NBC is taping a lot of major conferences for brokers. It's saving us a lot of trips to New York."

"There are no commercials," said Maxine Martell, general manager of Video Programming Services based here, the affiliate of Private Satellite Network, Inc. that markets the NBC service. It carries breaking news such as Federal Reserve announcements, as well as taped interviews with industry chiefs and analysts, which are broadcast from 8 a.m. to 5 p.m., Monday through Friday. The service costs $850 per month for the programming fee to support as many as 20 terminals.

Private Satellite Network converts the NBC analog video signal into compressed digital form to save on transmission costs, then transmits it via satellite at rates from 128K to 512K bit/sec over either C- or Ku-band frequencies. The subscriber's very small aperture terminal receives the satellite feed, then passes it through a Compression Labs, Inc. Spec-

(continued on page 20)

INDUSTRY BRIEFS

IBM takes action. IBM last week announced plans to cut its work force by about 25,000 in 1993 and close manufacturing facilities in an effort to make the company more efficient and profitable. The moves will result in a $6 billion charge against fourth-quarter earnings.

IBM Chairman John Akers said the company will try to cut expenses in its large systems and storage businesses and target overall development spending, which will be reduced by about $1 billion next year. Development expenditures will be shifted to growth areas, including services, software, client/server computing, networking and multimedia.

Novell posts revenue, earnings gains. Novell, Inc. reported $933 million in revenue for its 1992 fiscal year, ended Oct. 31, up 46% from $640 million last year. Earnings were $249 million, rising 53%. Revenue for the fourth quarter was $260 million, up 39% from the same period last year, while earnings were $70 million, up 37%.

PacTel plans wireless spin-off. Pacific Telesis Group's board of directors has voted unanimously to spin off the regional Bell holding company's wireless business, which includes cellular and paging operations. The move is designed to free the wireless business from regulatory barriers and to

(continued on page 20)

Client/server drives 1992 net market

continued from page 19

showed strong earnings and sales, their stocks have disappointed investors, said Rick Kimball, a managing director at Montgomery Securities in San Francisco.

Novell is scaling new financial heights for a network software vendor. It has a market capitalization (the stock price multiplied by the number of outstanding shares) of about $9 billion. That is $2.3 billion more than the market capitalization of Apple Computer, Inc., which was recently rumored to be interested in buying Novell — a rumor quashed by Novell.

Database vendors are benefiting from the deployment of the client/server infrastructure, including Unix-based servers. Oracle, which had a rough 1991, bounced back with about a 60% jump in stock price from last year, said Jim Mendelson, computer software and services analyst at Morgan Stanley & Company, Inc.

"As you get people trying to implement client/server, it's very key to have an open database," he said. ▣

Industry Briefs

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achieve greater shareholder value. The plan, which is expected to take a year to roll out, is subject to regulatory review.

IBM takes stake in CASEWORKS. IBM last week announced it will buy a minority stake in CASEWORKS, Inc., an Atlanta developer of workstation-based application software development tools. CASEWORKS makes tools that enable users and vendors to build the graphical user interface component of client/server applications with a common look and feel across multiple workstation platforms.

Ameritech to sell PictureTel gear. Ameritech Information Systems, Inc., a Chicago-based subsidiary of Ameritech, last week announced plans to distribute and service PictureTel Corp.'s full line of videoconferencing systems. Under a two-year renewable agreement, Ameritech will offer PictureTel products in Illinois, Indiana, Michigan, Ohio and Wisconsin. Financial terms were not disclosed. ▣

NBC gives financial firms market info

continued from page 19

trumSaver integrated receiver coder/decoder, a required piece of customer premises equipment, to convert the signal back to analog. From there, the signal travels through a local-area network or directly to a PC or Business TV terminal.

T. Rowe Price, one of the early users, now has eight PCs whose monitors are outfitted with IBM Personal System/2 television video boards to process the public service commission satellite signals. Investors simply enter keyboard commands to control the sound and video display screen size. They can also run other applications simultaneously while viewing the news.

Private Financial Network can be used with MS-DOS and Windows Version 3.0, and, possibly soon, Version 3.1.

The investment firm has also placed a TV set — the more traditional display equipment for Business TV analog broadcasts — in its trading room for general viewing. Bill Raab, network manager at T. Rowe Price, said the company may integrate the NBC video service into its LAN, too, to expand use of the service.

Don Mazullo, director of engineering at Private Satellite Network, said the service can be transmitted over a token-ring LAN by using a coupler from IBM that allows data and radio frequency signals to share the same wire. It also segments the types of traffic to prevent data traffic from interfering with the video signal. He said Private Satellite Network markets its own line of couplers for Ethernet.

Even as the NBC analog video service starts to win acceptance, the broadcast network has embarked on a pilot video-to-the-desktop news service, this time in partnership with IBM and NuMedia Corp. in Alexandria, Va.

Planned for 1994 availability, NBC Desktop News will be offered in both digital and analog forms and consist of a compilation of short news reports — most no longer than two minutes each — suited to each individual's interests, such as the pharmaceutical industry.

For the digital version, information will be downlinked from a satellite and stored in an IBM PS/2 server for distribution to networked PCs on either Ethernet or token ring. The NuMedia Desktop TV software will be used to customize the content for each LAN-based user. Mike Wheeler, NBC spokesman, said the on-demand service will allow users to call up stored news items using keyboard function keys and store them again on their PCs. ▣

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Worth Noting

In multimedia, "we should watch the same players that we watch today. The big user companies are not going to buy these technologies from start-ups, they're going to buy from Microsoft, Apple, IBM, Digital and so on."

Peter Kastner
Vice-president
Aberdeen Group, Inc.
Boston

Manager Minutes

NetWorld 93 Boston will be held Jan. 12-14 at the Hynes Convention Center in Boston. The show, "The Universal Communications Network," will have a series of educational seminars divided into tracks, such as fundamentals, planning and design, wide-area networks, strategic directions and business management, software and applications, management of technical issues, enterprise networking and interoperability, and reliability, availability and serviceability.

Elaine Bond, senior technology consultant at The Chase Manhattan Bank, N.A., will deliver the keynote address.

To register for the show, call (800) 829-3976.

A series of one-day seminars, called "Project Management," will be held in several cities throughout New England next month. The course, offered by **Fred Pryor Seminars,** will offer tips on successful project management.

The course costs $195 per attendee. For more information, call (800) 255-6139.

Weighing the international virtual alternative

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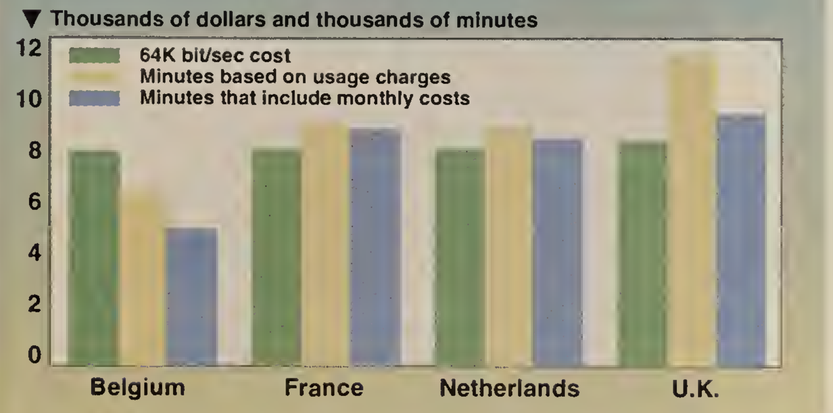

Figures are from "The Economics of U.S.-European International Networks," a study from Lynx Technologies, Inc., which is available free to international network planners. For more information, contact Lynx's Howard Fromm at (201) 256-7200.

GRAPHIC BY SUSAN J. CHAMPENY

Factors leading up to whistle blowing

Study says firms must keep communication lines open in order to curb employee wrongdoing.

By Joanne Cummings
Senior Writer

MADISON, Wis. — Managers looking to cut down on fraudulent and wasteful behavior among employees need to take a hard look at their corporate culture and open avenues for communicating wrongdoing.

Those are some findings of a study recently conducted by John Keenan, an associate professor of management at the University of Wisconsin here. Keenan found that several factors, including perceived management tolerance, contribute to whether employees will blow the whistle on coworkers' fraudulent behavior.

The most important factor determining whether employees will report wrongdoing is individual propensity, or the degree to which a person approves of whistle-blowing and feels personally responsible for doing so after observing someone breaking the rules.

But the second most important factor is organizational propensity, or the degree to which individuals feel the company encourages whistle-blowing. If this encouragement does not occur, the study said, it may be construed as a sign that reporting fraudulent behavior is not considered important.

"If bottom-line pressures and a 'don't rock the boat' mentality prevail, fraudulent practices will continue," Keenan said. "This eventually can lead to a loss of clients, customers or employees, along with the potential for costly lawsuits and negative publicity."

Policies and standards

In addition to encouragement, organizations need to develop and communicate clear policies and standards related to ethical issues, as well as provide employees with adequate information on where and how to blow the whistle.

> Organizations need to develop and communicate clear policies and standards related to ethical issues.

▲▲▲

Other factors leading to whistle-blowing include having a graduate degree, lack of fear of retaliation and having a union environment.

For more information or a copy of the study, call The Institute of Management Sciences at (401) 274-2525.

MANAGING TECHNOLOGY

BY ERIC SCHMALL

Santa readies gifts for industry professionals

The holiday season prompts us to reflect upon our profession's most desired gifts. Here is an exclusive list of what's being developed in the labs close to the North Pole (Silicon Glacier):

First, a selective Music on Hold adjunct for all digital private branch exchanges. This comes with a simple software table that allows you to customize the music individual users hear while on hold. This means aspiring yuppies hear New Age pan pipes, the mailroom cowboys get Billy Ray Cyrus, and the systems programmers freaks finally get Metallica.

The Big Chill baby boomers have a generous helping of Motown, the accounting folks get Mantovani and the auditors get white noise.

Finally, everybody mellows out to the music they love to wait by.

Another gift is the automatic telephone survey voice attendant.

This Reduced Instruction Set Computing-based machine sits in front of your PBX. All the numbers from every research survey company come loaded into its database, and when an incoming call from one of these groups is detected, it rolls the caller to its automated voice receiver.

The receiver then identifies itself as the individual department who researches, recommends or approves everything to do with voice/data communications.

Using very fuzzy logic and indeterminate phraseology algorithms, this machine proceeds with contradictory answers and randomly generated ratings to each question posed.

Finally, there's the Truth in Advertising Bungee Jump Challenge.

At long last, we're offered a method for testing the veracity of any marketing representatives who come to call. After patiently listening to the standard assurances about this brouter's mean time between failures or some carrier's pledge of 99.9999% availability, you can invite the marketer to take a ride 65 feet up to the Platform of Truth.

After trussing up the representative, you simply set the bungee cord reliability dial to the same failure probability as the product being pushed. Then tell the representative to fall forward. Refusals mean the sale is obviously off.

If the representative leaps and the cord holds, you can safely assume the product does what it's supposed to do.

If the representative jumps and the cord doesn't hold, well, you can later explain that you measured cord reliability in terms of "errored seconds."

Schmall is director of telecommunications for an insurance holding company.

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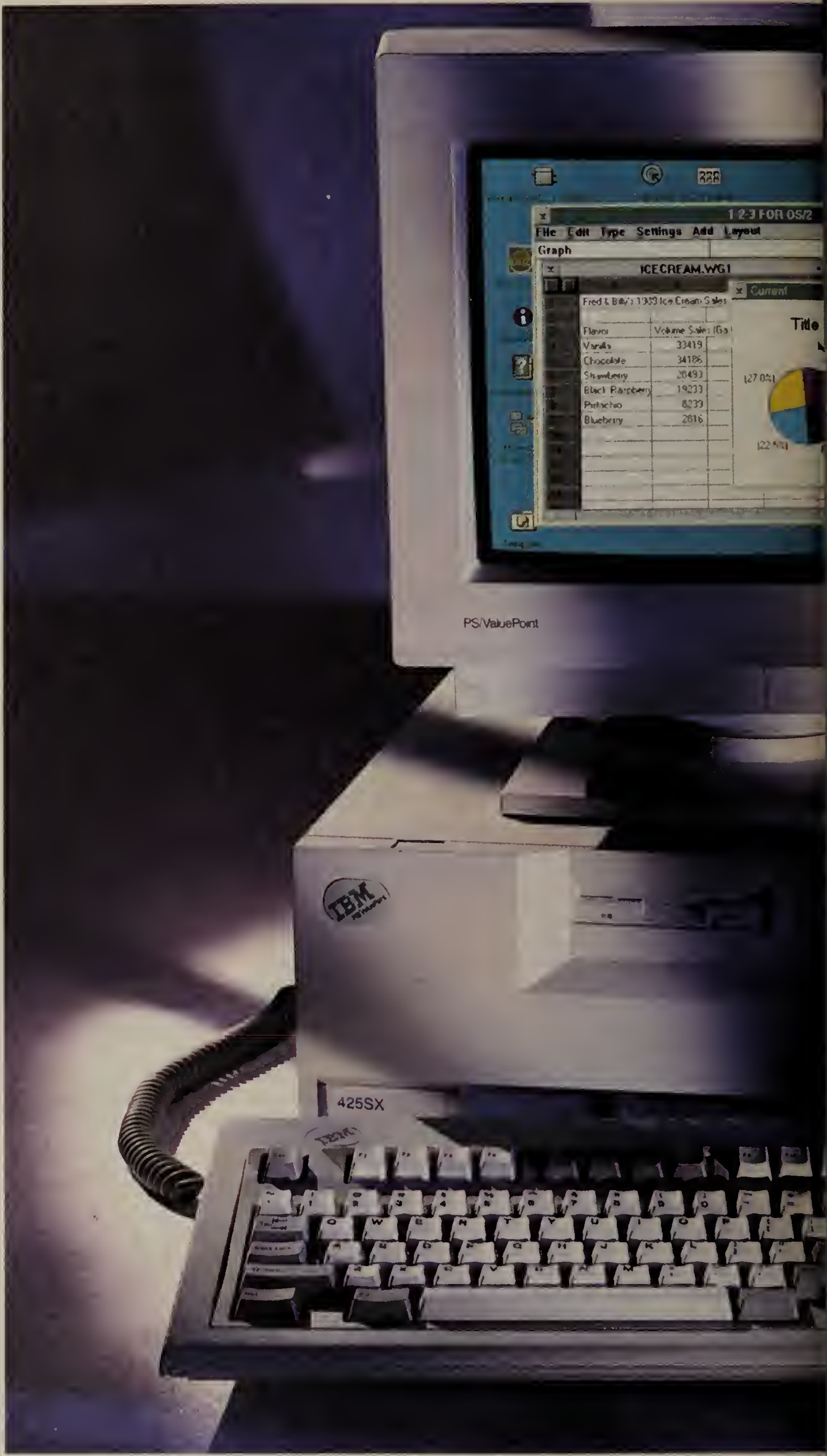

†*Models 425 SX and 433 DX are shown with the PS/ValuePoint 6314 Color Monitor.*

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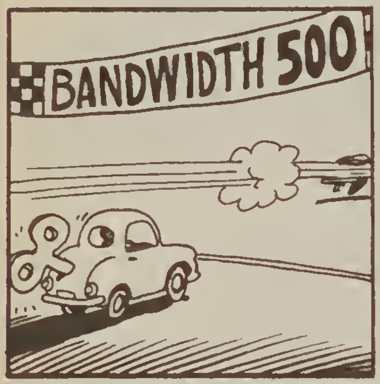
OPINIONS

TRIP '92 AND YUGOS, TOO

BY JAMES CARLINI

RBHCs need to refocus ISDN efforts

Transcontinental ISDN Project (TRIP) '92 was not as great as the hype that brought everyone together to witness a videoconference call connecting several locations across the country. Poor-quality video at all locations and very poor voice quality at one location made Integrated Services Digital Network look, to the uninformed, as if it took a giant step backward. The demonstration supposedly used 384K bit/sec circuits, but you would have never known it. Previous ISDN demonstrations that worked well made this particular one a nonevent. Besides, the videoconference could have worked better without ISDN.



A few weeks after TRIP '92, Northwestern University used two 56K bit/sec lines to demonstrate a videoconference among sites in Chicago, Detroit and Kansas City, Mo., and it came off beautifully. Video and voice quality were clear.

When are the regional Bell holding companies going to learn that we are beyond ISDN Basic Rate Interface as a super solution? The RBHCs should concentrate more on selling the real technology that ISDN helped to develop. For instance, ISDN is the behind-the-scenes building block for Synchronous Optical Network (SONET) and many intelligent network offerings.

Let's draw an analogy to Northrop Corp.'s F-40 Tigershark. Nothing was wrong with the airplane's technology, but the U.S. military wouldn't buy it because the officials knew something better was on the horizon. Northrop used F-40 technology to acquire other government contracts, which led to its involvement in the Stealth and B-1 bomber projects.

The same approach is needed for ISDN. The RBHCs should be gearing up to provide multimegabit and multigigabit services instead of trying to push old solutions. Forget the 64K bit/sec in an ISDN B channel. Users need real bandwidth, and they need it ubiquitously, not just in the 200 major metropolitan areas the RBHCs have targeted for ISDN deployment.

When consulting on a very large system integration project in Chicago that will come on-line in 1995, I recommended that the user look at SONET as the backbone network vehicle of choice. Forget ISDN over copper as a delivery vehicle. Get the phone companies to bring fiber to the doorstep today.

ISDN Basic Rate Interface is a network Yugo. When given a vehicle such as a Yugo, users will eventually reach the speed limit. When given a network Ferrari, such as SONET, users will have few limitations.

Not enough bandwidth is always a limiting factor in getting users to the next plateau of application sophistication. By getting fiber and SONET services from the central office up-front, bandwidth becomes a nonissue and users can implement all kinds of new applications.

A suggestion for TRIP '93: Concentrate on showcasing real stuff for real applications at real speeds.

Carlini is president of Carlini & Associates, Inc., a management consulting firm in Hinsdale, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

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John Gallant

Executive Editor
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Assistant Managing Editor — News
Paul Desmond

Senior Editors/News Coordinators
Bob Brown — Industry Update
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Bob Wallace — Global Services

Caryn Gillooly — Local Networking
5423 Gladewright Drive
Centreville, Va. 22020
Phone: (703) 266-1537
Fax: (703) 266-1543
MCI Mail: cgillooly

Senior Editors
Jim Duffy — Data Net Architectures
Michael Cooney — Data Net Architectures
14701 Bentley Square
Centreville, VA 22020
Phone: (703) 830-8138
Fax: (703) 830-7963

Senior Writers
Joanne Cummings — Management Strategies
Reader Advocacy Force Coordinator
67 Highgate Road
Marlborough, MA 01752
Phone: (508) 481-6061
Fax: (508) 485-5809

Maureen Molloy — Internetworks

Staff Writer
Skip MacAskill — Internetworks

West Coast Bureau
Timothy O'Brien
Bureau Chief/Enterprise Applications
2088 Union Street, Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-3530
Fax: (415) 771-2817

Washington D.C. Bureau
Anita Taff
Bureau Chief/Global Services
Phone: (202) 879-6744

Ellen Messmer — Senior Correspondent
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
Phone: (202) 879-6752

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EDITORIAL

Ring in 1993 by wringing better deals from 800 vendors

Consider this Part 3 of an informal series on how to get the most for your 1993 network dollars.

Two weeks ago, we asked why the prices of personal computer network products, such as adapters and gateways, remain high relative to the prices of PCs themselves, and we urged you to press vendors for discounts. Last week, we focused on one market segment — Fiber Distributed Data Interface networks, where the time is ripe for smart shopping.

This week, we turn our attention to 800 services. If you use toll-free service, now's the time to start shopping around for a better deal.

You've probably heard about 800 portability, and you probably know the deadline for portability has been pushed back to May 1. But that doesn't mean you ought to wait for deals to come looking for you.

Start bargaining now with your 800 carrier and its rivals for a better package of price, options and management features.

Sure, there are technical and pricing questions about 800 portability (''Nagging questions tarnish allure of 800 portability,'' *NW*, Nov. 30). But carriers are viewing portability either with dread — in the case of market leader AT&T — or relish, and in both cases, they want to sew up business now.

Why wait until you're just another face in the crowd looking to talk 800 deals later next year? Follow the example of National Westminster Bancorp, Inc. (NatWest), which cut an early deal with MCI Communications Corp. that will save it a bundle on toll-free service.

You say you're no corporate giant like NatWest? Not to worry. The carriers still need you. Remember, the bulk of market share is made up of thousands of small to midsize firms.

Even if you have no intention of changing carriers, the threat of switching could get you a better deal with your current provider.

Portability represents an almost unheard of opportunity. A multibillion-dollar marketplace opening up to true competition almost overnight.

Can you afford to pass up an opportunity like that?

OPINIONS

DISTRIBUTED COMPUTING

BY JOHN RYMER

New LAN mgmt. apps will arm users with better tools

LANs will take off as distributed computing platforms when the arcane administration utilities bundled into network operating systems are replaced with readily available LAN management applications running on a common network management system.

And the good news for users is that such applications are now emerging. Networx, Inc. of Bellevue, Wash., Remedy Corp. of Mountain View, Calif., Sybase, Inc. of Emeryville, Calif., and EcoSystems Software, Inc. of Cupertino, Calif., have all introduced local-area network management applications that run on such common management systems as Hewlett-Packard Co.'s OpenView and SunConnect's SunNet Manager.

Novell, Inc. and IBM are also building management systems that will run third party-developed LAN management applications. Meanwhile, Network Computing, Inc. of San Jose, Calif., may blow away both IBM and Novell by aligning its impressive LAN management platform with OpenView.

But clearly, it will be third-party applications that will give users a greater range of functions and management capabilities than the rudimentary set of applications that are bundled with common LAN management platforms such as OpenView and SunNet Manager. In particular, these third-party applications appear to hold the key to automating management tasks.

The marketplace for third-party LAN management applications will evolve in three stages.

First, vendors of network devices will port the applications used to control their devices to a common management platform. For instance, hub and router vendors will write applications to manage their equipment from a common management console.

Next, applications that provide general management functions across multivendor networks will appear. For example, the market will witness the emergence of trouble ticketing, performance analysis and network inventory applications that use the basic filtering, agent communications and automatic address discovery features of a common network management platform to manage multiple vendors' devices.

> The continuing evolution of the application marketplace is encouraging.
>
> ▲▲▲

Typically, the first products to deliver these general functions enjoy a virtual monopoly for a time simply because they are the only options available to users. Remedy's Action Request System (ARS) is a good example of this.

When it was announced in late 1991, ARS was the only independently produced trouble-ticketing system that ran on a common management platform. Remedy recently followed this success with Health Profiler, a network monitoring application that appears to have a unique niche.

In the third phase, the market will mature to the point where multiple vendors will offer applications providing similar functionality. Networx's Paradigm is an example of a management application in this category. It is the second major application for trouble ticketing. Paradigm offers users a richer management architecture out of the box than ARS does.

At the same time, new products will emerge en masse that will enable users to manage applications running in a distributed environment.

EcoSystems' EcoTools for Oracle Corp.'s database management system and Sybase's Control Servers for its SQL Server DBMS environment are examples of such emerging products. Both EcoTools and Control Servers promise to give users a greater degree of management control over relational DBMS servers and front-end applications than is available today.

Most of the LAN management application market is in the first stage of evolution. Some functional areas — such as inventory management and areas of application management — have progressed to the second stage. Trouble ticketing recently entered the third phase.

The continuing evolution of the LAN management application marketplace is encouraging. The market is by no means perfect. Vendors are still struggling to break down the barriers between LAN, systems and applications management information. To users, these barriers are artificial. Still, we're headed in the right direction. ◘

Rymer is vice-president of the Patricia Seybold Group, Inc. and editor in chief of the "Distributed Computing Monitor," a monthly analysis report. He is also chairman of the annual Patricia Seybold Marathon Week conference on distributed object computing and open systems.

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TELETOONS

BY FRANK AND TROISE

Let's see... what else?... oh, yeah!... The sleigh needs brakes, the chocolate's frozen solid and ELF-NET is down again.
DECEMBER
Phil Frank

LETTERS

Quality job

I compliment you on the User Excellence Awards articles in your Nov. 23, 1992, issue.

Such articles keep users focused on the real objective, which is to help the entire organization succeed. Furthermore, they help top management see that their information systems and networking people are not just an expense item, as the Medical Center of Delaware article pointed out.

Everyone needs to be reminded that we must not allow the alligator attacks to deter us from our true mission. Keep up the good work.

Tyler Williams
President
Potomac, Piedmont & Western Corp.
Drakes Branch, Va.

More on loopbacks

I'd like to share a personal experience in reference to a recent letter ("Loopback tests," *NW*, Nov. 9) about an Alligators in the Swamp article ("Carrier circuit problem throws user net for a loop," *NW*, Sept. 28).

I've done special service testing and installation since 1964. The best procedure I've found for isolating faults in a point-to-point data circuit is to loop back the far end of the circuit with a transmission measuring set (TMS) and test the entire circuit first. This can save time if the circuit is good.

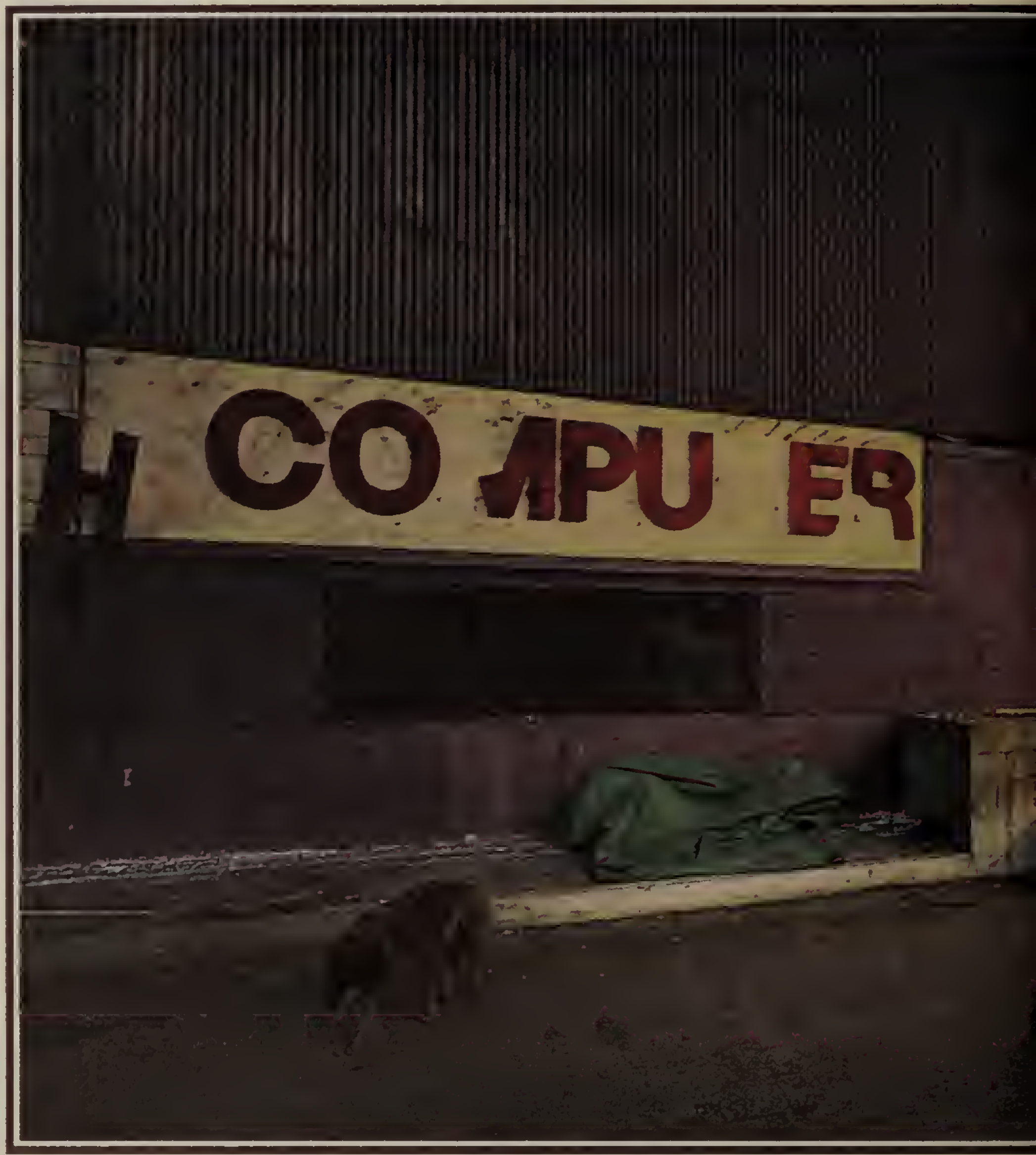
If the circuit is bad, further loopback tests can be performed to isolate where the problem is. If the speaker is on the receiver side of the circuit, it is simple to verify that the loopback has been released because the tone sent from the TMS will go off after a few seconds when the loopback releases.

Tom Steele
Manager of Offical Services
Provisioning
The Ohio Bell Telephone Co.
Columbus, Ohio

Want to respond to an article or opinion in Network World? *Mail typed letters to Editor,* Network World, *161 Worcester Road, Framingham, Mass. 01701, or fax them to (508) 820-3467. Transmit your response via MCI Mail at 390-4868 or to our Bulletin Board System. (See page 2 for BBS instructions.) Letters may be edited for space and clarity.*

OUR COMPUTERS TO OUTLAST MOST CO

Pick up a paper and you'll no doubt read about another PC company on the brink of collapse. Does it matter? Not much. Unless you're stuck with a computer that's out of commission from a company that's out of business.



In the 80's, it seemed every time you turned around a new computer company opened up. For a while it looked like all you needed was a soldering iron, a toll-free phone number and a P.O. Box to get started.

Those days are over. The market has matured. Customers are demanding more. And clone companies are faced with an ugly reality: the less you know about making computers, the less likely you're going to be successful at it.

Writers in the press and financial analysts on Wall Street are even compiling lists as to which are about to go under. While all of these involve an amount of speculation on the part of their authors, you may be surprised to learn that many of the larger clone companies appear on the majority of them.

It is not a question of whether it will happen. It is only a question of when.

All of which means that choosing the right computer company has

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ARE ENGINEERED MPUTER COMPANIES.

become every bit as important as choosing the right computer. It is no longer enough to compare price, product specs, service and support and then come to your decision.

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With their current credit and cash flow problems, buying computers from financially vulnerable clone companies has become something of a gamble.

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Users wonder if ISDN can endure

Slow deployment, high equipment costs continue as marks against ISDN, while newer advanced services vie for user attention.

Industry sages have been predicting the demise of Integrated Services Digital Networks for some time now. But in the wake of last month's broadly supported Transcontinental ISDN Project (TRIP) '92 event, many users may now think the technology is on the rebound.

"It's not dead," says Mary Johnston Turner, principal with Northeast Consulting Resources, Inc. in Boston. "It will be a focused technology, a part of a network planner's tool kit, but not the center of it."

ISDN seems to be plodding along, with the regional Bell holding companies continuing to deploy it in switches and filing tariffs for new services. To some end users, this is an exercise in futility; to others, it's about time.

"ISDN is happening regardless of your opinion of [it]," says Jay Duncanson, founder of Ascend Communications, Inc., an Alameda, Calif., manufacturer of network access equipment. "There will be a lot of people who will solve a lot of problems with ISDN."

Despite the enthusiasm, ISDN will not emerge as the mainstay advanced digital service carriers had hoped it would be. Instead, it will vie for users against newer services such as frame relay, Switched Multimegabit Data Service (SMDS) and eventually Asynchronous Transfer Mode, some of which outclass ISDN for high-speed applications.

Still, users will consider ISDN for such data applications as infrequent, intermittent file and electronic mail transfers, LAN-to-LAN connections to remote sites and disaster recovery backups.

The interexchange carriers and RBHCs still have their work cut out for them, not the least of which is a skeptical user base fixated on other up and coming technologies. Issues such as availability of ISDN and extra costs for ISDN customer premises equipment are dogging efforts to implement wide-scale applications.

ISDN, however, is making serious inroads into the user populace. Carroll Claybaugh, information systems director for the city of Colorado Springs, is one believer. "ISDN works if you use it for what it was designed," Claybaugh says. The city is using it for mainframe and local-area network access from remote sites.

The city of Colorado Springs' network was the first municipal state government net in the 14-state US West, Inc. region to implement ISDN back in 1989. Today, it has more than 160 Basic Rate Interface (BRI) lines connecting 35 locations.

ISDN BRI technology provides users with two 64K bit/sec B, or bearer, channels for voice and data, and one 16K bit/sec D, or data, channel for signaling. ISDN Primary Rate Interface (PRI) offers 23 64K bit/sec B channels and one 64K bit/sec D channel or 24 B channels with the signaling carriers on another PRI.

"We got into ISDN for three reasons: to get into data networking, integrate voice and data, and save money. We've hit all of those with our BRIs," says Bob Kelso, telecommunications manager for the city of Colorado Springs.

The major problems with initial ISDN efforts seem to have been identified and are being worked through. "We see ISDN as one of the day-to-day solutions to choose from for our applications, and it's a growing resource," says Jim Briggs, telecommunications manager at Eastman Kodak Co. in Rochester, N.Y.

Applications not a problem

Contrary to opinion, users seem to have no difficulty finding ways to use ISDN.

For example, Northwest Airlines, Inc. recently contracted with AT&T for a new reservations net that will link seven centers in the U.S. via ISDN.

"To us, every call is a customer," says Fay Beauchine, vice-president of reservations sales and service at Northwest Airlines. Northwest is using AT&T Definity Communications Systems G3s, equipped with ISDN-based call attendant features, to route calls around its network based on factors such as time of day, day of week and available agents in order to get the calls answered as quickly as possible.

Eastman Kodak is using ISDN worldwide for a broad range of applications including interswitch trunking between three Northern Telecom, Inc. SL-100s in Rochester; international videoconferencing; advanced voice features on the internal network, such as network ring-again; Group IV facsimile among 13 sales offices in Japan; optical disk image access in Australia; and Systems Network Architecture backup circuits in France. Planned for the near future are computer-aided design and manufacturing file transfer in Italy as well as remote image access via Kodak Picture Exchange or customer-owned photo compact discs.

"We got involved with ISDN because it was a global strategy," Briggs says. "In Japan, we save more than 60% on our fax traffic and get better quality with ISDN."

Briggs says Eastman Kodak has not had problems in the local loop like other users. "Rochester Tel has been so aggressive that it's stimulated us into ISDN," he says.

Bausch & Lomb is another firm using ISDN for a number of applications. One major use is in recouping customers that hang up before customer service agents can answer the calls. With ISDN, the company records the inbound calling number and the next available agent calls back.

"Callers couldn't believe we'd take the time to do that," says Janice Glerum, director of customer service for Bausch and Lomb's contact lens division.

Schindler Elevator Corp. is yet another proponent of ISDN. The company plans to convert to ISDN over a three-year period, installing PRI at 37 sites and BRI at more than 200 sites.

"If I did not have PRI in my network, I'd need two voice mail systems, despite what the vendors say [about interlinking with non-ISDN technology]," says Ed Hodgson, Schindler's telecommunications manager, who also serves as chairman emeritus of the ISDN User Group. "Basic rate interface local access costs substantially less than switched 56K/64K bit/sec local access, too."

Some users have been burned by early ISDN enthusiasm. JC Penney Company, Inc.'s senior project manager for communications systems, Bob Valliere, told

(continued on page 32)

Bellcore and COS maintain information hot lines to answer questions regarding ISDN. Call the Bellcore ISDN line at (800) 992-4736 or the COS ISDN line at (800) 759-2674.

By DANIEL BRIERE and MARK LANGNER

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(continued from page 29)

Network World in March that his firm had shelved plans for widescale use of ISDN PRI, saying the service is too expensive and not deployed widely enough. Since then, rates for PRI have dropped and availability increased.

Projected U.S. ISDN presence

Carrier	% central offices (CO) with ISDN (1)				% subscriber lines with ISDN (2)				% CO switches with ISDN				% ISDN switches with Signaling System 7 (SS7) (3)			
	1991	1992	1993	1994	1991	1992	1993	1994	1991	1992	1993	1994	1991	1992	1993	1994
Ameritech	6.9	8.6	25.8	40.4	21	24	51	70	6.1	7.6	22.7	35.6	47	90	93	96
Bell Atlantic Corp. (4)	23.6	25.4	36.7	50	48.7	48.9	57.8	87	23.6	25.3	36.7	50.1	100	100	100	100
BellSouth Corp.	7.5	12.9	17.7	22	13.3	25.3	41	52	7.3	12.4	17.2	21.5	100	100	100	100
Cincinnati Bell, Inc.	16.4	22	31	38	31.6	38.4	52.4	63	16	21.4	30.4	39.3	0	11.1	40.7	68.5
Nynex Corp.	.5	2.9	5.3	7.6	2.1	15.9	23.7	31.4	.47	2.7	5.6	8.0	100	100	100	100
Pacific Bell	10	16	21.5	26.6	30.2	44	56.8	68.8	10	15.6	20.6	25.2	13	46	78	100
Rochester Telephone Corp.	32	34	41	41	68	70	78	77	33	35	42	42	74	95	100	100
Southwestern Bell Corp.	4.4	5.8	7.4	8.6	13	16	19	21	4.8	6.3	7.7	8.8	0	80	95	99
US West, Inc.	6.2	8.5	12.8	14.3	28.7	36	54	58.8	6	8.2	11.9	13.2	80	90	99	99.5

(1) COs in which at least 1 switch is equipped for ISDN.
(2) Subscriber lines from COs that have at least 1 switch equipped for ISDN.
(3) For connectivity between COs, SS7 must be based on TR-NWT-000444.
(4) Figures based on actual projections from Bell Atlantic. All other figures estimated based on 1992 CO, line and switch figures.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

Applications defined

The advent of standardized BRI service nationwide under National ISDN 1 represents the biggest news for end users. National ISDN 1 is a set of technical requirements that make available for the first time interoperable, all-digital networks with standard network interfaces and uniform service capabilities.

The broad consensus for the National ISDN standards will make it possible for manufacturers to produce products that will work anywhere ISDN is offered, regardless of which switch is handling the calls, since National ISDN 1 standardizes signaling protocols and messages between the switch and customers' equipment.

Prior to National ISDN 1, equipment designed for a particular manufacturer's central office switch would only work when attached to that vendor's switch.

Reggie Best, vice-president of marketing for equipment maker Teleos Communications, Inc. in Eatontown, N.J., sees ISDN catching on, especially for telecommuting.

"The state of California has already issued regulations mandating companies to formulate telecommuting or work-at-home programs," he says. "Standardized BRI immediately drives telecommuting to the head of the BRI application list, doing for telecommuting what PRI initially did for videoconferencing."

To help bundle applications for customers, Pacific Bell recently signed a comarketing agreement with Teleos to sell its CommuterSystem for remote LAN access via ISDN BRI.

The North American ISDN Users' Forum (NIUF) recently released a final draft of its "Catalog of National ISDN Solutions for Selected NIUF Applications," which details actual user implementations of 38 major ISDN applications. Many of these were showcased at the recent TRIP '92 show, which demonstrated more than 180 applications in all.

"TRIP '92 launched a permanent network; it was real, and it was not put together for a show and tell," says Dick Aloia, assistant vice-president of ISDN and data communications technology at Bell Communications Research.

National ISDN I is an important first step, but not the only step by any means.

Next year, National ISDN 2 will add PRI functionality and broaden the overall offering. "National ISDN 2 will fill in a lot of the gaps that were left out in the rush to get ISDN 1 moving," says Fred Kempf, member of the technical staff at SouthWestern Bell Technology Resources in St. Louis.

"National ISDN is the big payoff for all of the vendors that have spent untold hours educating users as to the benefits of ISDN," says Teleos' Best. "Users know what ISDN services can provide, and RBOC BRI deployment will be driven by these users demanding not only the services, but competitive pricing, too."

Application overload

Having applications for ISDN is not the problem. "We've got enough applications to last four or five years," says Ron Olkewicz, director of sales and marketing at the Fujitsu Network Switching Systems Division in Raleigh, N.C. "We need to learn to market the ones we have."

Events such as TRIP '92 will get ISDN out in front of the end-user populace, but the question remains for some as to whether the carriers are truly up to the challenge of selling and installing ISDN on a widespread basis. "The work toward the National ISDN 1 standards is great, but that only solves the problems of getting the software and equipment into switches," Duncanson says. "That does not help deployment itself."

Analysts agree. "The RBHCs' marketing of ISDN is a case study in what not to do with a new technology," says Michael Finneran, president of dBrn Associates in Hewlett Neck, N.Y. "They started overselling this in 1985 and, since then, have turned off so many end users that you'd think they would have figured it out by now. But they haven't. The RBHCs intend to sell ISDN services under different product names in different jurisdictions, a formula that runs counter to the fundamental requirement to build a mass market," he says.

Finneran's biggest concerns were with the back office. "They are not ready for ISDN with all the back-office processes," says Finneran, commenting that the testing and ordering procedures are not prepared for substantial ISDN orders.

Not surprisingly, the RBHCs disagree. "Our switched data minutes of use have gone from 100,000 minutes in April 1992 to 7 million minutes in October 1992," says Wayne Purvis, Pacific Bell's ISDN project manager. "At least 80% of that is running over ISDN. You don't get that kind of growth without having a solid program."

Divorcing Centrex and ISDN

Purvis notes that Pacific Bell is seeing ISDN sold more and more as an automatic companion to Centrex. "A year ago, maybe 10% of the Centrex access lines we sold were ISDN; today, that's over 25%," he claims, attributing the change to greater acceptance of ISDN and its applications by end users.

However, a common complaint from end users is that to get ISDN, users also have to get Centrex, which is not needed in many cases. Like many of the RBHCs, Pacific Bell will soon divorce ISDN from Centrex. The carrier expects to see both BRI and PRI available in 1993.

"We would have seen a steeper curve for ISDN if we'd made it available without Centrex from the beginning," Purvis says.

The RBHCs' deployment of ISDN as part of Centrex was an attempt to take advantage of their embedded base of business customers.

"Centrex was their flagship product, and ISDN provided a means to enhance the Centrex product and make it a better competitor against the premises-based PBX," Finneran says.

According to Finneran, the RBHCs are taking a phased approach to ISDN marketing. "They rolled out to Centrex customers first, and now they are concentrating on small businesses with or without Centrex, then telecommuters, then high-end residence and then the mass market," Finneran says. "Eventually, ISDN will be as cheap as regular telephone service, but that's likely to be around the year 2000," he says.

Other carriers are likewise preparing for National ISDN 1. Ameritech is a good example of how the RBHCs are getting ready for the hoped-for ISDN onslaught. Ameritech filed PRI tariffs in September and has set Jan. 1, 1993, as its "Readiness to Serve" date for ISDN in all Ameritech territories. The carrier has aligned its state tariffs for ISDN BRI with one another and expects to file PRI tariffs in the first quarter of 1993.

"We have targeted our BRI pricing at 1.7 to 1.8 times that of a regular business line," says Bob Puissant, director of business development/data for Ameritech Services, Inc. "All our market research has shown that ISDN needs to prove in as an economic advantage over business POTS to succeed."

The carrier has also set up two specialized support centers — the Data Product Introduction Center (DPIC) and Data Marketing Support Center (DMSC). "The DPIC is designed to give the customers the hand-holding that will be required with ISDN," Puissant says. "With so much history with ISDN, we are putting extra effort into easing customer concerns."

Deployment issue looms

Certainly, deployment of ISDN to end users is a major issue. After all, if you cannot get ISDN, then the added marketing will not matter much.

"In Europe, they installed ISDN and people started using it," says Ascend's Duncanson.

(continued on page 39)

Call-by-call setup gives ISDN an edge

One of the big advantages of ISDN over today's T-1 technology is in the area of call-by-call setup.

With a T-1 circuit, customers generally must allocate channels for specific purposes; each T-1 has 24 channels, so six of them might be allocated for virtual net service, six for videoconferencing, eight for switched data local-area network connectivity options and four for 800 services. This channel division allows the carrier to know what is coming across each channel at any particular time.

AT&T offers Static Integrated Network Access, while MCI Communications Corp. and Sprint Corp. have service under the same name, T-1 Access Partitioning.

With ISDN Primary Rate Interface (PRI) service, this fixed allocation is not required because the D channel of the PRI communicates with the telephone network, letting it know what is coming over the B-channel circuits. So, the channel chosen for an application can vary on a call-by-call basis. One advantage here is efficiency in circuit utilization. Under the static environment, if a circuit is not in use it cannot be used for other applications. With PRI, it can be used like any other circuit.

"The impact of call-by-call service selection is to reduce the number of access trunks required," says Michael Finneran, president of dBrn Associates in Hewlett Neck, N.Y. "That impact will most likely be offset by the higher cost of PRI."

The problem that has arisen is that there has been no control over the PRI bandwidth to keep one application from hogging the circuit. If someone were to dial up a large chunk of the bandwidth for a file transfer, it could block all inbound and outbound calls over that circuit.

Toward that end, Teleos Communications, Inc. and Sprint codeveloped a bandwidth controller based on Teleos' NetworkHub series of access devices. The product, dubbed the Integrated Access Controller, sets minimum and maximum bandwidth allocations to particular applications in order to prevent bandwidth brownouts.

— Daniel Briere
and Mark Langner

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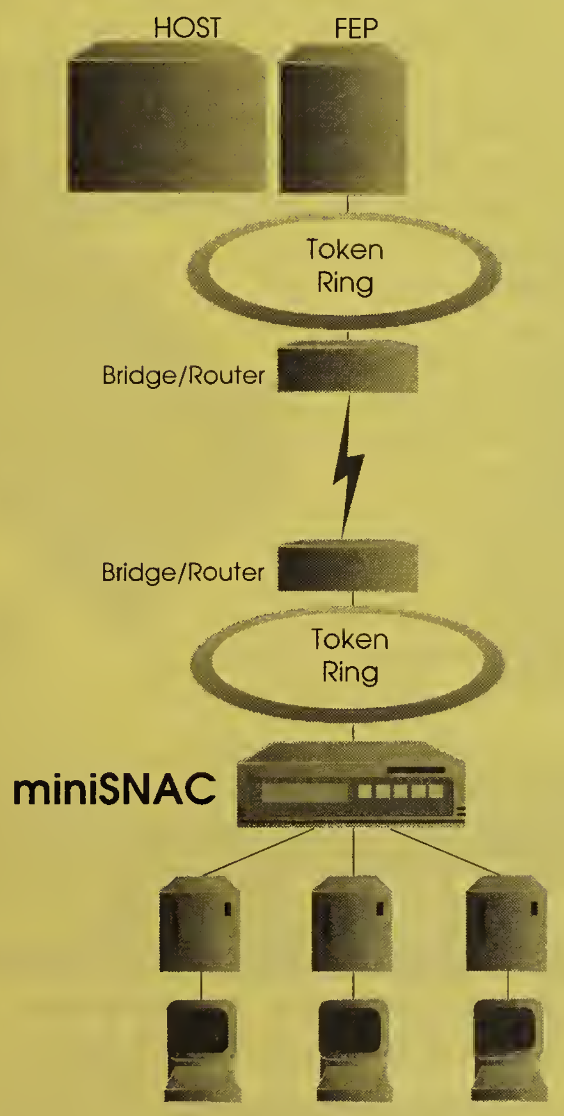

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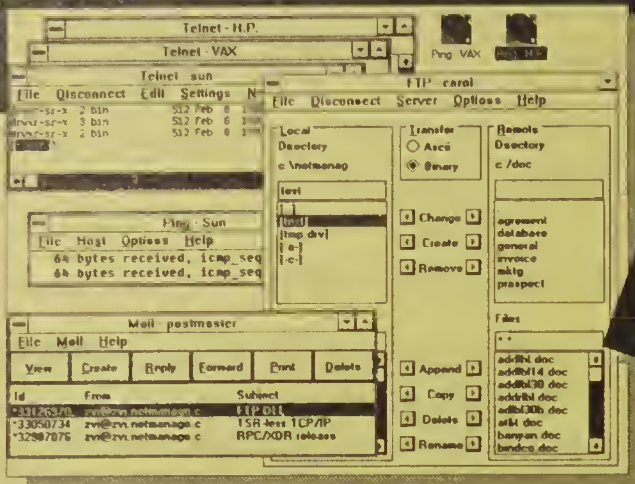

```
64 bytes received, icmp_seq
64 bytes received, icmp_seq
```

```
Id         From                  Subject
*33126370  zvi@zvi.netmanage.c   FTP DLL
*33050734  zvi@zvi.netmanage.c   TSR-less TCP/IP
*32987076  zvi@zvi.netmanage.c   RPC/XDR release
```

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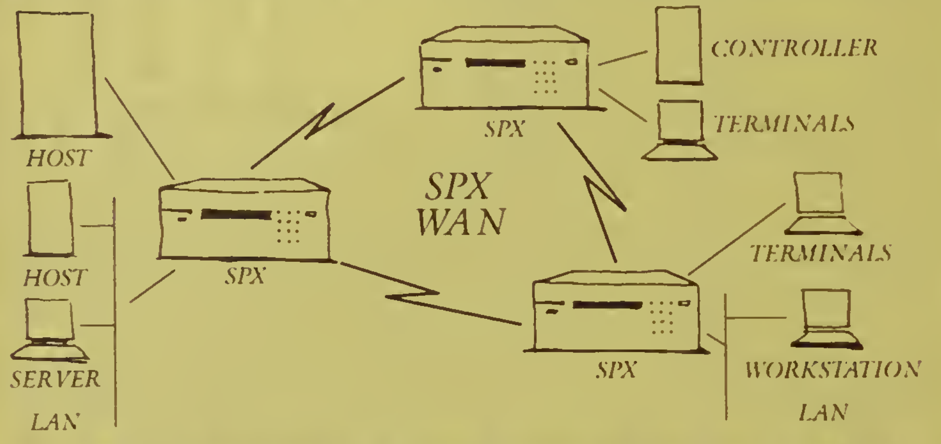

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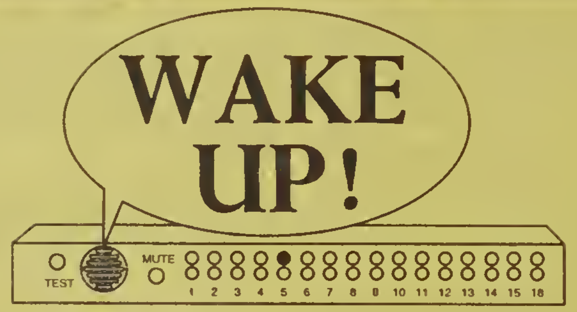

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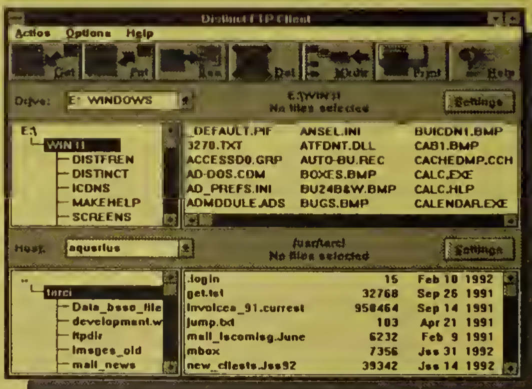

```
E:\WIN31
No files selected

E:\
 └WIN31
   ├DISTFREN
   ├DISTINCT
   ├ICONS
   ├MAKEHELP
   └SCREENS

_DEFAULT.PIF    ANSEL.INI      BUICDN1.BMP
3270.TXT        ATFDNT.DLL     CAB1.BMP
ACCESSD0.GRP    AUTO-BU.REC    CACHEDMP.CCH
AD-DOS.COM      BOXES.BMP      CALC.EXE
AD_PREFS.INI    BU24B&W.BMP    CALC.HLP
ADMODULE.ADS    BUGS.BMP       CALENDAR.EXE

/usr/tarci
No files selected

..
 └tarci
   ├Data_base_file
   ├development.w
   ├ftpdir
   ├images_old
   └mail_news

.login                    15   Feb 10 1992
get.txt                32768   Sep 26 1991
invoices_91.current   958464   Sep 14 1991
jump.txt                 103   Apr 21 1991
mail_incoming.June      6232   Feb  9 1991
mbox                    7356   Jan 31 1992
new_clients.Jan92      39342   Jan 14 1992
```

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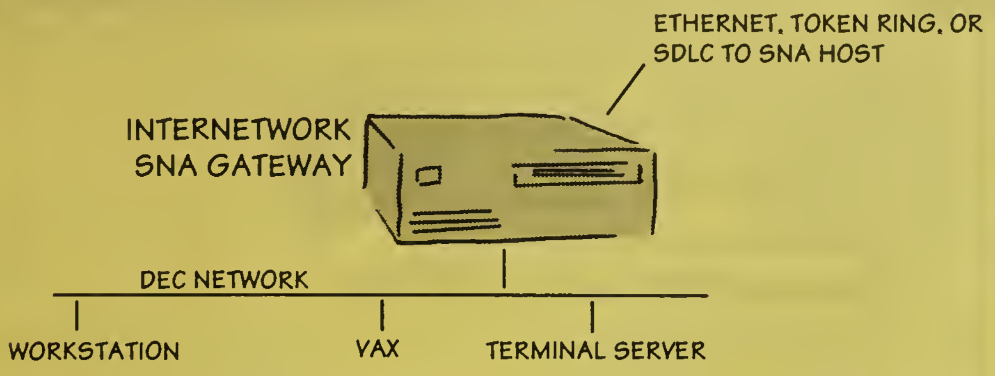

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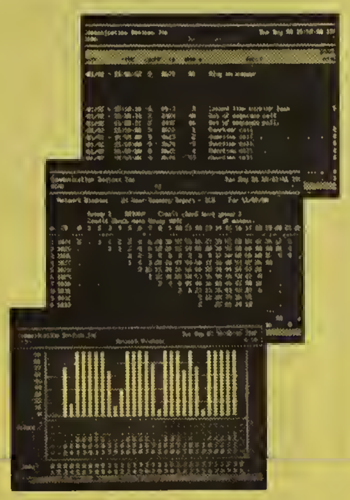

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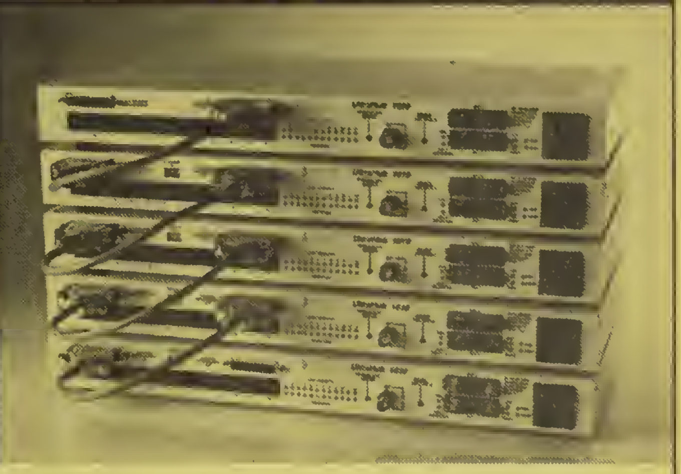

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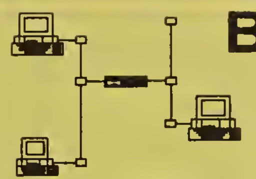

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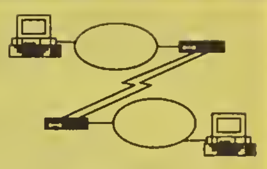

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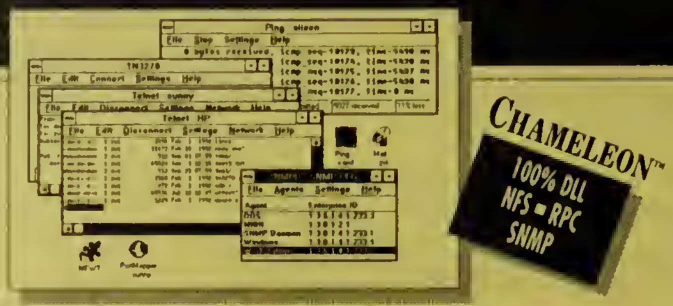

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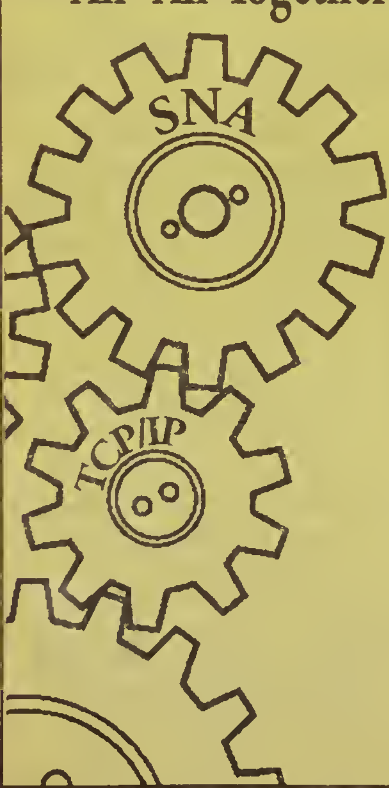

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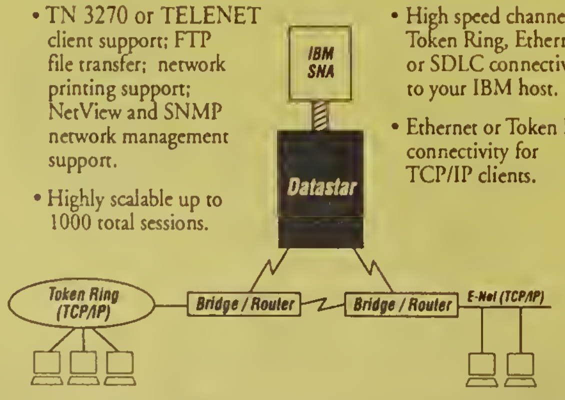

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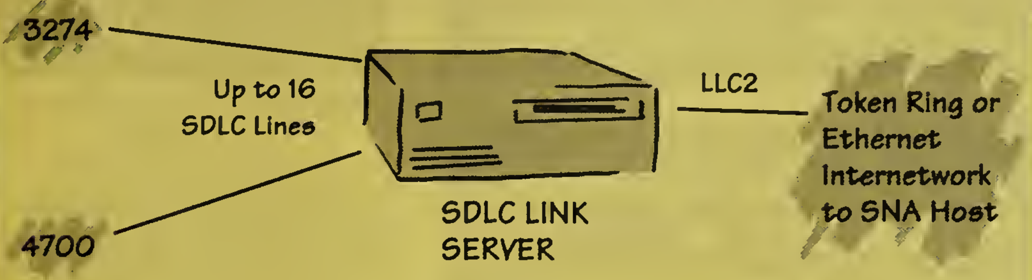

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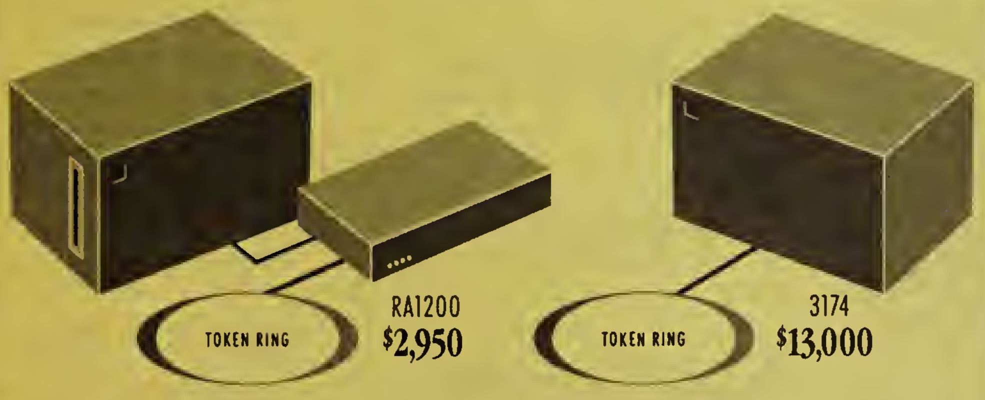

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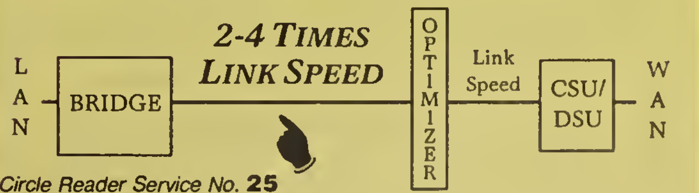

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(continued from page 32)

"We need to do the same here."

The RBHCs collectively have sworn to move ISDN off the drafting tables and into the network in a last-ditch effort to make it succeed. The most recent deployment figures are shown in the graphic on page 32.

Top 10 ISDN applications

The most wanted applications by end users are:

1. Telecommuting
2. Videoconferencing
3. Multipoint screen sharing
4. Customer service call handling
5. ISDN telephone/workstation integration
6. Image communications
7. Remote terminal access to LANs
8. Automatic number identification/calling line identification
9. High-speed file exchange
10. At-home agents

SOURCE: NORTH AMERICAN ISDN USERS' FORUM AND BELLCORE
GRAPHIC BY TERRI MITCHELL

Bellcore updates a listing of deployment schedules for each region every six months and releases this data in Special Report SR-NWT-2102. For many, this represents the bottom line as to when ISDN will be a reality in their area.

End users should expect some holes in the nationwide ISDN fabric for some time. ISDN will grow in availability throughout 1993 and 1994, with most of the nation covered by then. Of the RBHCs, Southwestern Bell Corp. and Nynex Corp. appear to be the laggards, reaching only 21% and 31%, respectively, of the total ISDN lines installed by the end of 1994.

Still, there will always be availability problems, for at least the near term. "Our ISDN-supported offices are not tied together on a wide-area basis because there is no [Signaling System 7]," says the city of Colorado Springs' Kelso. "We can't talk to Denver via ISDN, and we're only 70 miles apart."

Kelso notes that the deployment schedules are just now being finalized for his area. "They are not terribly aggressive," he says. "They are not rushing it too much. It's certainly not spreading like wildfire." Kelso says that if there were more deployment, he would install more ISDN.

Terminal equipment

To most end users interviewed, the high cost of ISDN equipment remains another hurdle for its implementation. "It still costs more than $1,000 for a terminal adapter and a special NT-1 terminating device vs. a 9.6K bit/sec modem that sells for about $400 — that's a joke," says dBrn's Finneran.

Eastman Kodak's Briggs agrees. "CPE is far too expensive," he says. "When you try telecommuting with ISDN, you have to replace analog-based modems and workstations, and that can get expensive." Briggs says he would like to see customer premises equipment prices at least 25% to 30% lower.

That may or may not happen. According to market researcher International Data Corp. (IDC) of Framingham, Mass., the average price for an ISDN terminal adapter is expected to plummet to only $350 in 1995, down from $1,450 in 1990. That's a cumulative average decrease of nearly 25% per year.

Today, the average terminal adapter price is less than $1,000, according to IDC. For some, that's still too high.

"Pricing will come down dramatically because it has to," says Doug Gold, director of communications for IDC. "It needs to be competitive with local-area network technology."

Equipment vendors blame high prices on low sales and unfair comparisons. "What will make prices go down? Volume," says Fujitsu's Olkewicz.

"When people evaluate the cost of ISDN CPE, they must be careful to compare apples to apples," Olkewicz says. A true apples-to-apples ISDN comparison, he says, would be looking at a fully featured electronic key telephone, which would run about $250, and a high-speed 19.2K bit/sec modem, which could be as high as $750.

"If you have to throw in the NT-1, which runs $200 to $300 extra, you are still in the same order of magnitude," he says. "And if you compare the features of those electronic devices with an ISDN set, you find that the ISDN set offers better price/performance."

Long haulers moving fast

The long-distance carriers seem to be handling ISDN with relative ease. "We've had no problems with our PRI implementations at all," says a telecommunications manager who asked to remain anonymous. His firm, a pharmaceuticals maker, uses PRI to connect with AT&T's 56K and 64K bit/sec Software-Defined Data Network (SDDN) services for its worldwide video network.

The user employs Ascend Multiband inverse multiplexers to support a video network that spans more than eight countries. The pharmaceuticals company prefers to use the inverse multiplexer approach to gain higher bandwidth instead of an ISDN-based H0 384K bit/sec contiguous circuit.

"Our video applications are set up so that if one of the multiplexed circuits fails, then the application will still work," says the telecommunications manager. "With a contiguous H0-compliant 384K bit/sec stream, if that circuit fails, the entire application fails."

One problem with the ISDN H0 channels is that you cannot talk with other carriers' domestic users, such as MCI Communications Corp. or Sprint Corp. switched 56 data users. AT&T is the only carrier currently supporting H0.

AT&T has been putting a lot of effort into ISDN, treating the topic with special care.

This past May in Atlanta, the carrier opened its National ISDN Center, which is responsible for all ISDN provisioning, protocol testing and maintenance functions. The center supports all ISDN-related applications, including INFO-2, call-by-call service selection, Accunet Switched Digital Services and SDDN.

One customer, who declined to be identified, says his firm has had problems with this approach. "If your D channel goes down on a PRI, you are first handled by the T-1 maintenance people, who check the integrity of the T-1 itself. If there are no problems there, it is sent to the Atlanta group to check the PRI D channel," he says. "Frankly, 80% of the time, someone accidentally turned off the CPE that terminates the PRI. It just took a while to determine that."

MCI has taken a slightly different tack. "It's a mainstream service for us, and we have trained our entire force to deal with ISDN, instead of isolating the work," says Marlon Jahnke, senior manager of Vnet planning and implementation. MCI just recently expanded its domestic ISDN capabilities to allow service overseas.

Sprint, for its part, has been offering ISDN-based solutions in three countries for more than a year. In addition to switched 64K bit/sec service, Sprint's Global

(continued on page 40)

Changes loom on ISDN gear horizon

It looks like there are some big changes on the horizon for Integrated Services Digital Network equipment that could affect the way customers see ISDN-capable equipment.

The emergence of dial-up circuit switched network interfaces on local-area network routers, for instance, is one major trend that could reshape the way users think about deploying ISDN.

"ISDN is helping open up the WAN topologies, and the router manufacturers are responding by including ISDN as yet another connectivity option alongside private line and frame relay," says Rick Simonson, director of advanced services development for Sprint Corp. This will enable users to extend their LANs to smaller remote sites that do not have the traffic to justify a private link.

Several end users pointed to Sunnyvale, Calif.-based Combinet Corp.'s ISDN LAN Adapter/Remote Bridge as being ideal for LANs. "It's an 802.3 bridge using ISDN — perfect for LAN-to-LAN connectivity for our firm," says Ed Hodgson, telecommunications manager at Schindler Elevator Corp. and chairman emeritus of the ISDN User Group.

The device, about the size of a 2,400-baud modem, offers 10Base-T and 10Base-2 interfaces on the user network side and an ISDN Basic Rate Interface (BRI) on the public net side. "With our bridge, remote telecommuters do not require an on-site hub," says Steve McGee, national sales manager for Combinet. "It's bundled in the unit, and that saves at-home costs."

Another firm, DigiBoard, Inc., also offers an ISDN remote LAN connection product, dubbed IMAC. The product offers support for the Simple Network Management Protocol, making it accessible from any network management system that implements SNMP. The company recently started shipping Dual IMAC, which transmits data at 224K bit/sec over ISDN voice calls and up to 256K bit/sec over data calls.

Network Express, Inc. of Ann Arbor, Mich., is another new provider of these ISDN remote LAN connectivity products. The company demonstrated dial-up bandwidth applications with its NE InterHub at the recent Transcontinental ISDN Project (TRIP) '92 event.

"Dual IMAC is unique in that it can sustain rates of 224K bit/sec across digital trunking or long-distance voice networks, so you can get ISDN-like performance between areas of the country where ISDN is not yet implemented," says Ham Mathews, general manager of DigiBoard's telecommunications group.

Yet other vendors are reworking old system designs around the new capabilities. Rockwell International Corp. released a new integrated call processing system earlier this year that incorporates automatic call distribution, voice processing, automatic outbound call management and private branch exchange functions from various earlier systems into one new box. It was designed around ISDN, with Primary Rate Interface lines on the network side and BRI lines on the customer side. This new equipment and anticipated lower prices will buoy the move to ISDN.

"A lot of people are holding off for the National ISDN 1 standards so that they can buy equipment and plug it into any ISDN service in the country. With this finally in place, I think we'll really see ISDN take off," says Pat D'Innocenzo, ISDN product application manager at Bell Atlantic Corp.

ISDN required?

Still, for every piece of equipment that comes out supporting ISDN, it seems that there is one offering similar functionality without requiring ISDN.

Take Radish Communications Systems, Inc.'s VoiceView system that combines software on an IBM Personal Computer or Sun Microsystems, Inc. workstation with a modem-type device that connects a telephone and workstation. This allows users to transmit bit-mapped graphics, as well as integrated voice and data, over a single telephone line using standard telephone equipment and the existing telephone network.

"You don't need a BRI, just regular telephone lines," says Richard Davis, chairman and chief technical officer of Radish.

One application touted by the company is the ability for financial institutions with Sun workstations to exchange signature verifications and detailed financial graphics over a telephone line during the course of a normal phone call. Single screens or complete files from a variety of applications can be sent as VoiceView messages, which are transmitted during momentary pauses in the voice conversation.

"It allows our customers to realize many of the voice and data integration features of ISDN today without waiting for ISDN technology," says Doug Ehrenriech, telecommunications segment manager for Sun Microsystems Computer Corp.

— Daniel Briere
and Mark Langner

(continued from page 39)

Virtual Private Network offering allows end users to launch global voice features, such as network ring-again and network name display.

MCI has been making some headway with its non-ISDN-based switched T-1 offering.

"Our call setup is half a second," claims Greg Casagrande, manager of enterprise networking for GE Capital, which uses MCI's product for business recovery of T-1. "We needed to back up our front-end processors into our private network. If we lose either the dedicated facilities or the front-end processor, then it automatically dials up the MCI circuits."

Sprint, too, has been pushing ISDN BRI as a means to access its packet services. This allows users to access circuit and packet offerings from a single access device on a call-by-call basis, saving money.

"This may seem embarrassing to the RBHCs, but the [interexchange carriers] are really far ahead of them in ISDN," says Stan Kluz, manager of the ISDN data network for Lawrence Livermore National Laboratories in Livermore, Calif. "We can get [Federal Telecommunications System 2000] ISDN coast to coast anywhere in the U.S., but we have problems getting it down the street."

Lawrence Livermore has installed more than 10,000 BRI and 15 PRI lines at its sites. "We use ISDN for universal data connectivity," Kluz says. Among its applications are ISDN-to-Ethernet gateways for remote LAN access, packet switching over the D channel and work at home.

"CPE is far too expensive. When you try telecommuting with ISDN, you have to replace analog-based modems and workstations, and that can get expensive."

▲ ▲ ▲

Jim Briggs
Telecommunications manager
Eastman Kodak Co.

The Environmental Protection Agency (EPA) is another avid ISDN fan. The agency is using BRI and PRI technology at several locations for everything from ISDN logical D-channel packet-switched access for Unix systems to station-level billing.

"The EPA is very serious about ISDN, as shown by its investment nationwide to date," says Gary Plott, a consultant with Network Management, Inc., which provides the telecommunications support for the EPA.

One of the big problems the EPA has encountered has been deciphering problems on the network. "From Day One, we needed a product on site that could recognize [bipolar eight zero code substitution, extended superframe format] and, at the ISDN D-channel protocol itself, show us where the problems were on the terminal equipment and on the network side," Plott explains. "AT&T at the time could not provide us with a good enough method, so we went looking for equipment." Plott's firm ended up with Kamputech, Inc.'s KAT-1000 protocol analyzer.

"With that in hand, we could control our own destiny," he says.

Pressure from all sides

Certainly, the big pressure on ISDN will be from competing technologies. In the intervening years since ISDN was set up as the service to solve most end-user problems, other easier to implement technologies have come along.

Switched 56K bit/sec services have stolen a lot of the thunder from ISDN when it comes to data transmission. Many end users have seen the incremental difference between 56K and 64K bit/sec as not worth the effort.

While switched 64K bit/sec promises international integration, switched 56 service does not require ISDN, is accessible via Feature Group D dial-up access and is fairly widely available in the U.S.

"Switched 56K bit/sec was supposed to be a stopgap measure to ISDN, but it's ended up hurting the growth toward ISDN," says Ascend's Duncanson.

A few years back, ISDN was seen as *the* way to interconnect LANs and to meet data transmission requirements. Today, services such as frame relay, SMDS and other high-speed services are being considered instead. Users need to look at their applications to see what will fit best. In many cases, multiple services will be necessary.

"In a sophisticated world, you do not have one type of computer and one data type," Duncanson says. "It's like music: There's CDs, cassettes, records, eight-tracks, all meeting certain market needs. Data will have a similar selection."

ISDN will be attractive for lower speed data applications, which can be served at 16K bit/sec to 64K bit/sec rates with ISDN's packet switching capabilities, as well as 56K bit/sec rate-adapted and 64K bit/sec circuit switched data. Multiples of ISDN's 64K bit/sec circuits will provide up to T-1 and E-1 speeds of 1.536M and 1.920M bit/sec, respectively.

Indeed, users and carriers alike pointed to ISDN's circuit switched nature to solve many network problems.

"Carriers like AT&T, MCI and Sprint need to reach the mass market for applications like their developing video services," explains Teleos' Best. "Users will need dial-up digital access to the Internet, information providers

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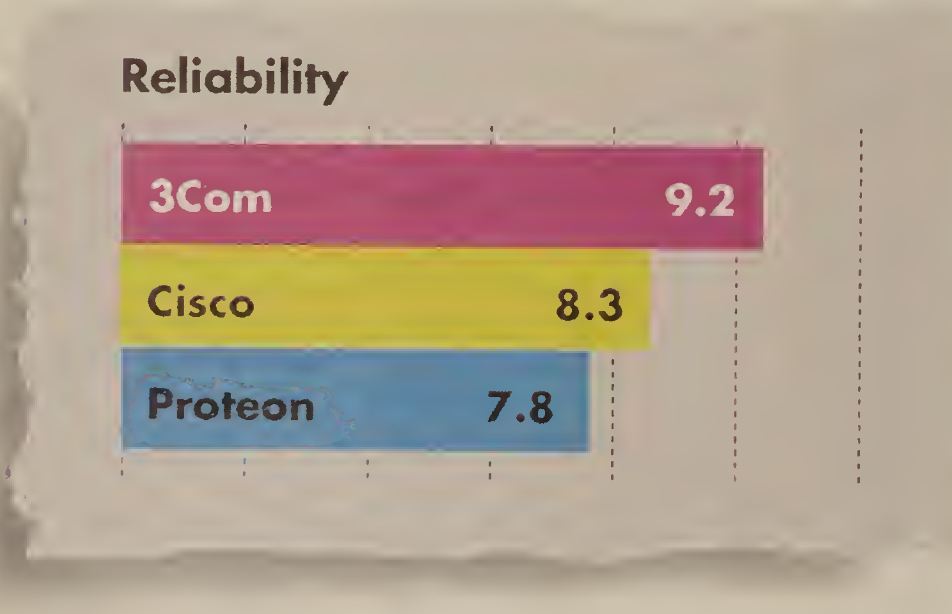

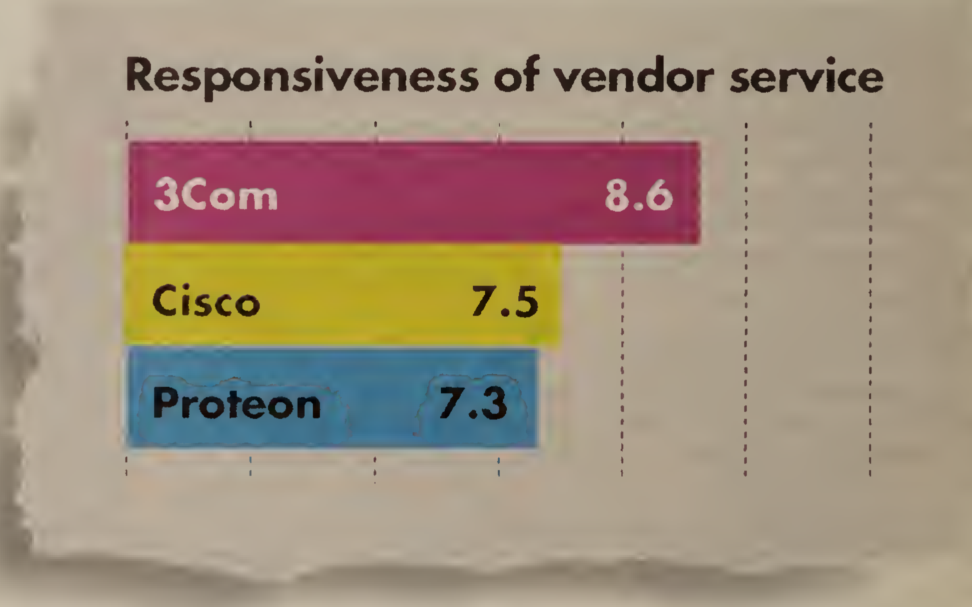

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and other third parties for things like video clips and stored images. That makes for a ready marketplace for ISDN's high-speed access."

Frame relay, by contrast, is targeted to large business networks by offering packet switching from 56K bit/sec to 1.536M bit/sec, providing better utilization of network resources and customer equipment.

Frame relay vendors are trying to boost the technology to 44M bit/sec speeds in the future. There are plans to map frame relay services into ISDN transmission capabilities in the near future, as well.

Another alternative, SMDS, is designed for high-speed applications, particularly those supported in LAN environments today. This technology supports communications from 1.17M bit/sec on 1.5M bit/sec access connections and up to 34M bit/sec on 44M bit/sec access, with the potential to go to higher speeds, such as 155M bit/sec. SMDS offers both intra- and interenterprise communications.

One of the major tasks ahead for ISDN enthusiasts is converting the data communications buyers who "hate the phone company," according to dBrn's Finneran. "They are so out of sync with this crowd. Datacomm buyers are clamoring for high-speed, packet-oriented services like frame relay and SMDS, while ISDN provides medium-speed, circuit switched capabilities. It's like the datacom folks called 'green, left, 44,' and the RBHCs went 'red, right, 42.' "

However, ISDN is not designed for all applications. "If corporate data backbones are the issue, then ISDN is not for you," says Bellcore's Aloia.

Price is going to be the key factor in any implementation decision, according to users.

"Dedicated private circuits and frame relay have a lot of price/performance here in the U.S. for LAN-to-LAN connectivity," says Eastman Kodak's Briggs. "But ISDN provides the critical access to the network — all the networks — and that's an important piece of the equation."

So just because you have frame relay or SMDS in your network does not mean you cannot use ISDN.

Looking to the future

Where does all this leave ISDN? "As a product in rollout," Best says. But it will still be fighting an uphill battle.

"Every year since 1985, we've been hearing that it was the year of ISDN," says L. Thomas Walton, president of Walton and Walton Associates, Inc., a consulting company in Richmond, Va. "It's tough not to be skeptical today. But at least we are seeing some dim light through the haze."

Problems with ISDN will continue to arise, but that's to be expected with any technology. "For months, we tried to get our Northern Telecom Meridian 1s working with our AT&T Definity G3 units, but we could not get the D channel to come up," says Schindler's Hodgson. "It finally worked in mid-November."

Ameritech's Puissant says problems are best handled when anticipated and planned for, rather than when they are surprises.

"It's unrealistic to expect no problems when installing a new technology," he says. "There's a natural learning curve to deal with. Areas where ISDN is being installed faster are moving quicker along that curve."

The jury's out

The burden is on the RBHCs to make ISDN the success it should be or shoulder the blame for the disappointment it has been.

Industry figures continue to point to the RBHCs as the parties responsible for holding everything up. ISDN cannot be a reality without ubiquitous deployment in the network; everyone agrees on that. "If the RBOCs can do 50% of what they say they are going to do, they are going to find the demand there," says Teleos' Best.

In defense of the RBHCs, dBrn's Finneran says they have more than 15,000 local central offices in the U.S., while AT&T's entire network has only 120 switches, and MCI and Sprint have fewer still.

"We're still waiting for someone to lead this industry," says Ascend's Duncanson. "There is no true champion for ISDN that is pushing this through. Everyone claims to be waiting on someone else."

ISDN is not dead, nor will it die. Some of the more proactive end users are incorporating ISDN into their networks, looking beyond the reputation that ISDN has had in the past.

For the RBHCs and everyone else involved in ISDN, the clock continues to tick as end users determine how to handle their traffic and network requirements.

"I don't mind looking at alternative technologies," says Kelso, who says frame relay just became available in Colorado Springs. "We are considering privatizing our network in the next few years, bypassing all of this and using fiber. We may not need to wait for ISDN." ☐

> "If corporate data backbones are the issue, then ISDN is not for you."
>
> ▲▲▲
>
> **Dick Aloia**
> Assistant vice-president of ISDN and data communications technology
> Bell Communications Research

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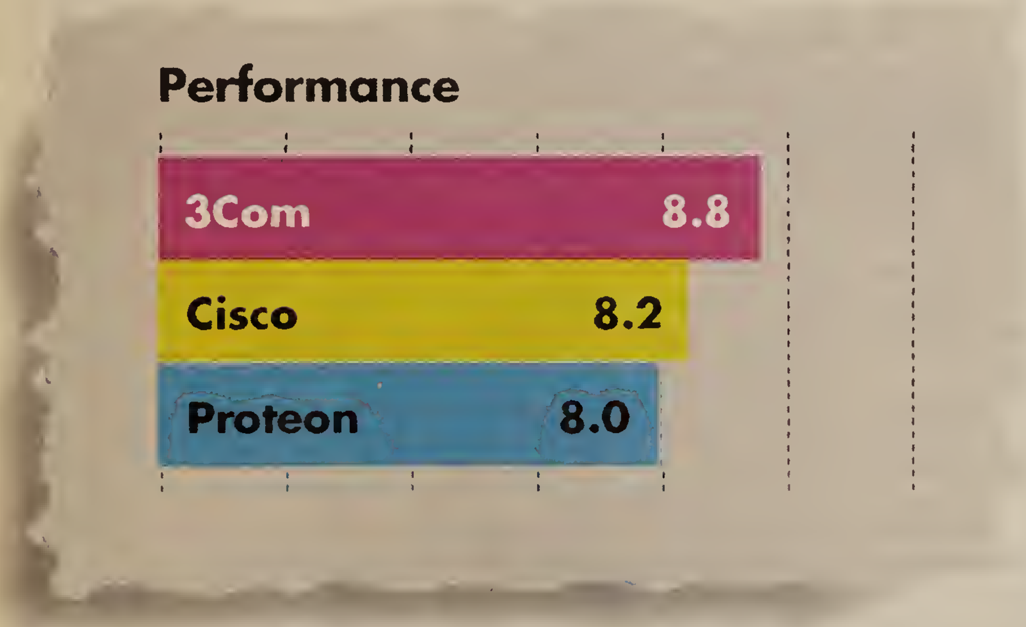

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Firm takes new approach

continued from page 1

tivity, McLoughlin and consultants from Arthur D. Little, Inc. earlier this year came up with a two-pronged strategy.

In the short-term, J.P. Morgan will continue building gateways between E-mail systems. At the same time, McLoughlin and her 10-person staff will begin laying the groundwork for implementation of a centralized X.400 hub based on Soft-Switch, Inc.'s Enterprise Mail Exchange (EMX) message switch.

The EMX, which Soft-Switch has built on top of a Data General Corp. AViiON Unix processor, will serve as a translation facility interconnecting J.P. Morgan's disparate E-mail systems (see graphic, page 1). E-mail servers at offices worldwide will be linked to the hub via the firm's global multiprotocol local-area network internet.

J.P. Morgan now supports IBM's Professional Office System, Lotus Development Corp.'s Notes, Microsoft Corp.'s Mail for PC Networks and Mail for Macintoshes, Digital Equipment Corp.'s All-in-1 and VAXmail, MCI Communications Corp.'s MCIMail and Unix E-mail systems. It plans to install EMX in mid-1993 and link all E-mail systems to it by first-quarter 1994.

While the EMX will provide any-to-any connectivity between E-mail systems, J.P. Morgan has architected the system to minimize gateway usage. Any E-mail traffic that needs to traverse different E-mail platforms will be routed through the EMX hub in New York. Traffic between similar E-mail systems will be routed directly across the internetwork.

For the most part, each J.P. Morgan business unit has standardized on a single E-mail platform, with Microsoft's Mail for PCs being the most prevalent. This standardization is key, McLoughlin said, because most E-mail messages are sent between workers within the same division.

"We want to minimize gateway usage so that users retain the full functionality of their E-mail systems instead of being limited to only those features [that are] common between two different systems," McLoughlin said.

McLoughlin said the EMX hub offers directory synchronization and network management features that will improve J.P. Morgan's ability to efficiently manage and integrate its disparate E-mail systems. Currently, the firm uses a hodgepodge of homegrown programs to synchronize directories of interconnected E-mail systems and manage remote E-mail servers. Unfortunately, these programs do not entirely automate the support processes.

Also, since the EMX message hub is based on Unix, it is easily scalable and portable, McLoughlin said. In the near future, this will enable J.P. Morgan to install an EMX switch in each hemisphere to better support E-mail traffic, she said.

The X.400 hubbed architecture gives J.P. Morgan a clean slate to tackle other nagging issues involved in managing a global E-mail system, such as providing users with remote access to LAN E-mail systems and implementing an X.500 directory. ☑

List filled with repeat wishes

continued from page 2

offer but nobody does," he said. "I want a product that can talk to the legacy systems, old Unix boxes, current SNA boxes, future systems and [Simple Network Management Protocol machines], as well, so I can get a complete view of my operation."

Numerous software-related requests were also voiced. Greg Scott, computer services manager for the College of Business at Oregon State University in Corvallis, wanted to see more progress in the development of groupware.

"It's my hope that we'll begin to see something tangible from some of the groupware companies," he said. Bill Connor, director of information technology for the general systems sector at Motorola, Inc., would like to see completion of the Open Software Foundation, Inc.'s Distributed Management Environment (DME) standard.

"The best gift I could receive would be a final and fully improved DME standard by the end of this year, but I'm probably a year too early," he said. "By the time they come out with the standard, there will be so many proprietary approaches that we won't have the benefit of the standard."

Visions of better integrated software tools are dancing around in the head of Bob Duke, member of the technical support staff at American Drug Stores in Oakbrook, Ill.

"I would like to see client/server software tools better integrate with one another without going through multiple iterations with the vendors," he said. "I'd also like to see all the tools we have on the mainframe appear on our servers and networks. That's beginning to happen, but it's been very slow."

Because 1992 has been a particularly hard year on many user companies due to the recession, some users were looking for much-needed relief.

Carol Baumann, the corporate telecommunications coordinator for American Drug, is a good example. "I'd like to return to the 1990 staff levels we had in my department before the economy really soured," she said.

Finally, lower prices and increased functionality for hubs was a request received from Claude King, senior systems analyst at the University of Florida in Gainesville.

"I hope the second generation of [collapsed backbone] devices is more useful in terms of the types of media supported, bridging capabilities by port and more routing features," he said. "I'd also like to see the prices come down on FDDI concentrators." ☑

Tool to support dist. apps

continued from page 1

available," he said.

Although some database companies such as Sybase, Inc. offer RPC technology as a tightly integrated component of their databases, Oracle is expected to offer its RPC facility as an independent tool portable across platforms.

Ellison said the company has been waiting to introduce its RPC facility while it studied emerging distributed software standards such as the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE).

"We've been asking ourselves if we should be DCE-compliant and what exactly our RPC should look like," he said.

Analysts offered guarded optimism about Oracle's RPC facility. They said distributed applications need to utilize some core services, such as security, directory and management facilities, which are generally tied tightly to database offerings. If that's the case, Oracle's new RPC facility will be best suited for its own database customers.

"This will certainly be good for Oracle-specific application environments," said Jamie Lewis, vice-president of The Burton Group in Salt Lake City. "But if Oracle is trying to position this as a standard for RPC development competing with DCE and others, I don't see that happening."

According to John Rymer, vice-president of Patricia Seybold's Office Computing Group in Boston, "The company is positioned to have a tremendous amount of leverage in this market. But users need to be aware of the trade-offs: Will you really be buying into an open solution?"

Companies such as Sybase, Hewlett-Packard Co. and Netwise, Inc. have offered RPC technology for years, but Oracle is taking a different tack in structuring the programming interface on its RPC facility.

With Oracle's RPC mechanism, RPC calls will be built with SQL syntax, reducing the complexity of programming.

"By hiding network and operating system complexity from programmers, Oracle is constantly making different things look the same," Ellison said.

One of the advantages of RPC technology is its ability to integrate relational databases and tools with legacy systems. Facing stiff competition from Sybase in the mainframe integration arena, Oracle teamed with Netwise in February for use of its database-independent RPC.

Netwise views the upcoming introduction of Oracle's RPC as complementary since the two companies' products will solve slightly different needs.

"For the Oracle customer, this RPC could be a good thing," said Bill Jacobs, director of product marketing at Netwise. "It will remain to be seen if this will work as well for customers having legacy databases, installed security and management systems." ☑

NETWORK WORLD

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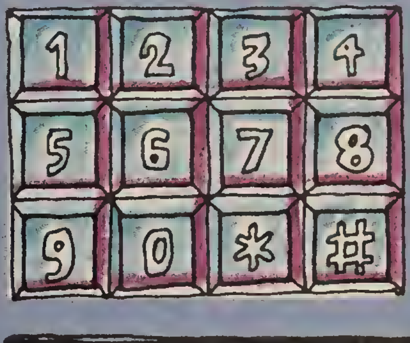
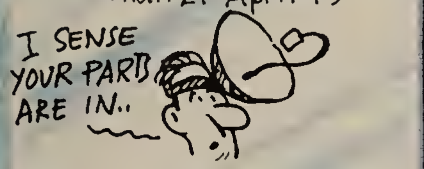
NETWORK ASTROLOGICAL GUIDE FOR '93

I, Madame Zuma, renowned network consultant, now bring my astrological services to offices around the globe. Use this machine wisely, and your networking future will be clearly revealed. The more quarters you put in, the clearer it gets.

SELECT YOUR SIGN:



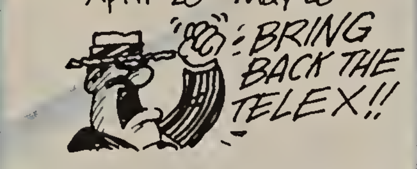
ARIES
Mar. 21- April 19


I SENSE YOUR PARTS ARE IN..

This year, it looks like your Saturn will be in Aries and your Mercury in Taurus. Therefore, look forward to a promising career in interplanetary networking or an entry-level position handling the satellite link at a local auto dealership. Could go either way.

PRESS 1

TAURUS
April 20- May 20


BRING BACK THE TELEX!!

While industrious by nature, you also tend to hold onto conservative ideas. Taurus people know in their hearts that PCs, LANs and downsizing are just passing trends. Go ahead, Taur, chain yourself to that mainframe in the basement and make your point!

PRESS 2

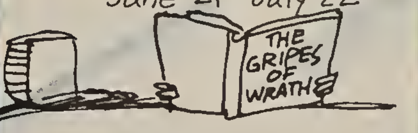
GEMINI
May 21- June 20

THIS IS ALL YOUR FAULT!
SAYS WHO?

Geminis, the Twins, naturally seek duplication in life. This is why you will take twice as long as anybody else to do things, with 100% cost overruns. But just show this fortune (twice) to your boss at review time, and everything will be fine. Trust me.

PRESS 3

CANCER
June 21- July 22



Traditionally known as the Crab, especially to coworkers, your new year will begin in harmony. This will be agonizing for you. But fortunately, your LANs will suddenly choke under increased traffic, leaving you silently thankful for having plenty to complain about.

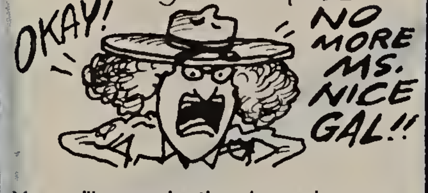
PRESS 4

LEO
July 23- Aug. 22

You have an unusually magnetic personality. This will, unfortunately, be a detriment in 1993 since you will periodically erase routing tables as you walk past routers, distort the calibration on test equipment and, worst of all, deplete the office's paper clip supply.

PRESS 5

VIRGO
Aug. 23- Sept. 22


OKAY!
NO MORE MS. NICE GAL!!

You will conscientiously apply your good manners, modesty and idealism in dealing with networking matters in 1993. Others will notice these refined traits, especially upper management, who will attempt to eat you for breakfast unless you get out there and kick some butt.

PRESS 6

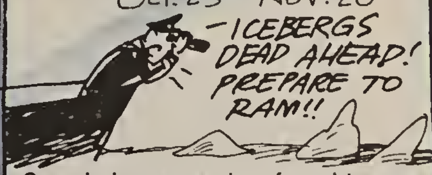
LIBRA
Sept. 23- Oct. 22

PLEASE!! NOT THE MODEM PROMO AGAIN!!

Everyone on your networking team knows Libras love justice. This is why you will submit a proposal to punish anyone who makes a planning or technical error by strapping them to a chair and making them watch 12 hours of vendor product briefings.

PRESS 7

SCORPIO
Oct. 23- Nov. 20


ICEBERGS DEAD AHEAD! PREPARE TO RAM!!

Scorpio is commonly referred to as "the iceberg." Now you know why you keep dreaming you worked in the *Titanic's* radio room in a past life. Not being a trend follower, you'll cling to current technology, even when it starts to list. Don't give up the ship in '93, Scorp, but try rowing with *two* oars for a change.

PRESS 8

SAGITTARIUS
Nov. 21- Dec. 21

HOLD MY CALLS I'M GOING TO RIO FOR LUNCH.

As the travel lover in your office, you will spend so much time out of town that your company will cancel your travel budget and buy a videoconferencing system for your use instead. Incensed, you will redeem your massive accumulation of frequent flyer miles for 51% of your company's stock and run things your way.

PRESS 9

CAPRICORN
Dec. 22- Jan. 19

With famous Capricorn J. Edgar Hoover as your inspiration, you're a natural this year to be given more responsibility for network security. However, Cap, try to balance your zeal for the job with a sense of diplomacy, possibly by rescinding your requirement for an inked faceprint of every user.

PRESS 10

AQUARIUS
Jan. 20- Feb. 18

Oh, Lord....
Please Join these LANs..

Everyone values the Aquarian tolerance for contradictions, and in 1993, your boss will notice your talent for connecting disparate entities. Look for exciting challenges, like being given five days to integrate your VINES, NetWare and LAN Manager LANs together, or else.

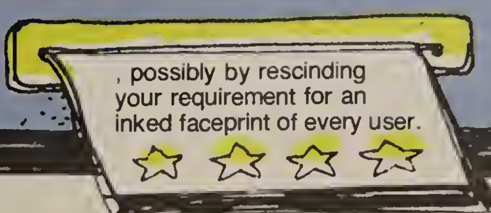
PRESS 11

PISCES
Feb. 19- Mar. 20

Pisces is associated with the fish, a nickname that will be used behind your back by vendors trying to sell you a soon-to-be-released product that uses APIs to solve all interoperability problems. Being a bit slimey yourself, however, you will hit the hook switch and drop off the line.

PRESS 12

YOUR FUTURE HERE



. . . possibly by rescinding your requirement for an inked faceprint of every user.

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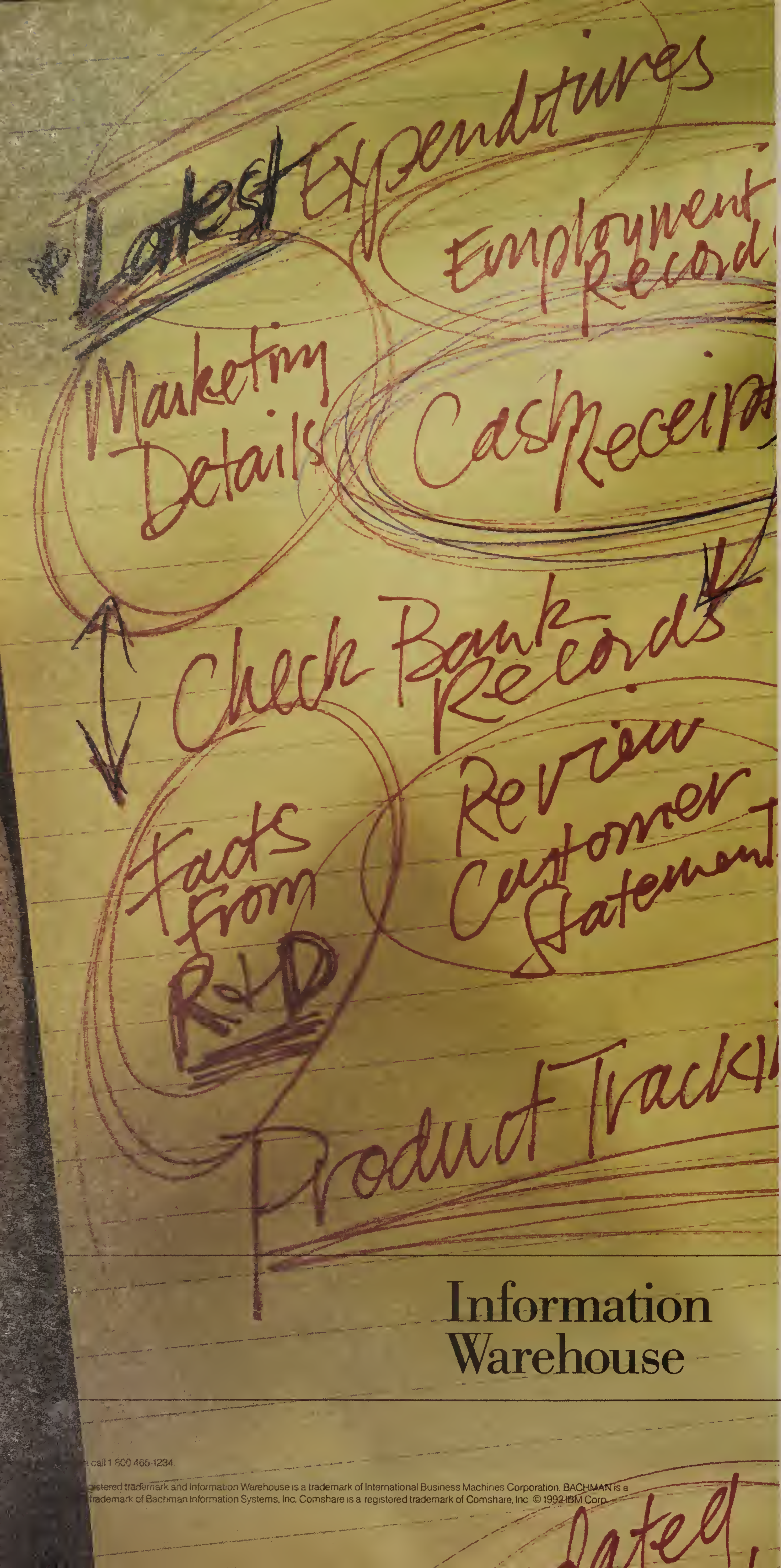

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With the exception of LiveNet and OSINET, these special attractions will be held on the main show floor in the convention center throughout the show.

LiveNet, the high-performance networking forum will show you which next-generation technologies are driving networking into the 21st century. Located at the Ramada Renaissance/Techworld, LiveNet will feature its own exhibit hall, conference and tutorial program and live network demonstration. *Sponsored by* Computerworld.

Open Software Foundation members will take part in the largest ever public demonstration of Distributed Computing Environment (DCE). See how DCE will facilitate the interoperability of local applications over heterogeneous wide area networks.

Network Management Forum members will display their OMNI*Point* products in a series of interoperable demonstrations. See how this showcase links members' booths together to show customer applications and solve specific customer problems. *Network Management Forum is a co-sponsor of ComNet.*

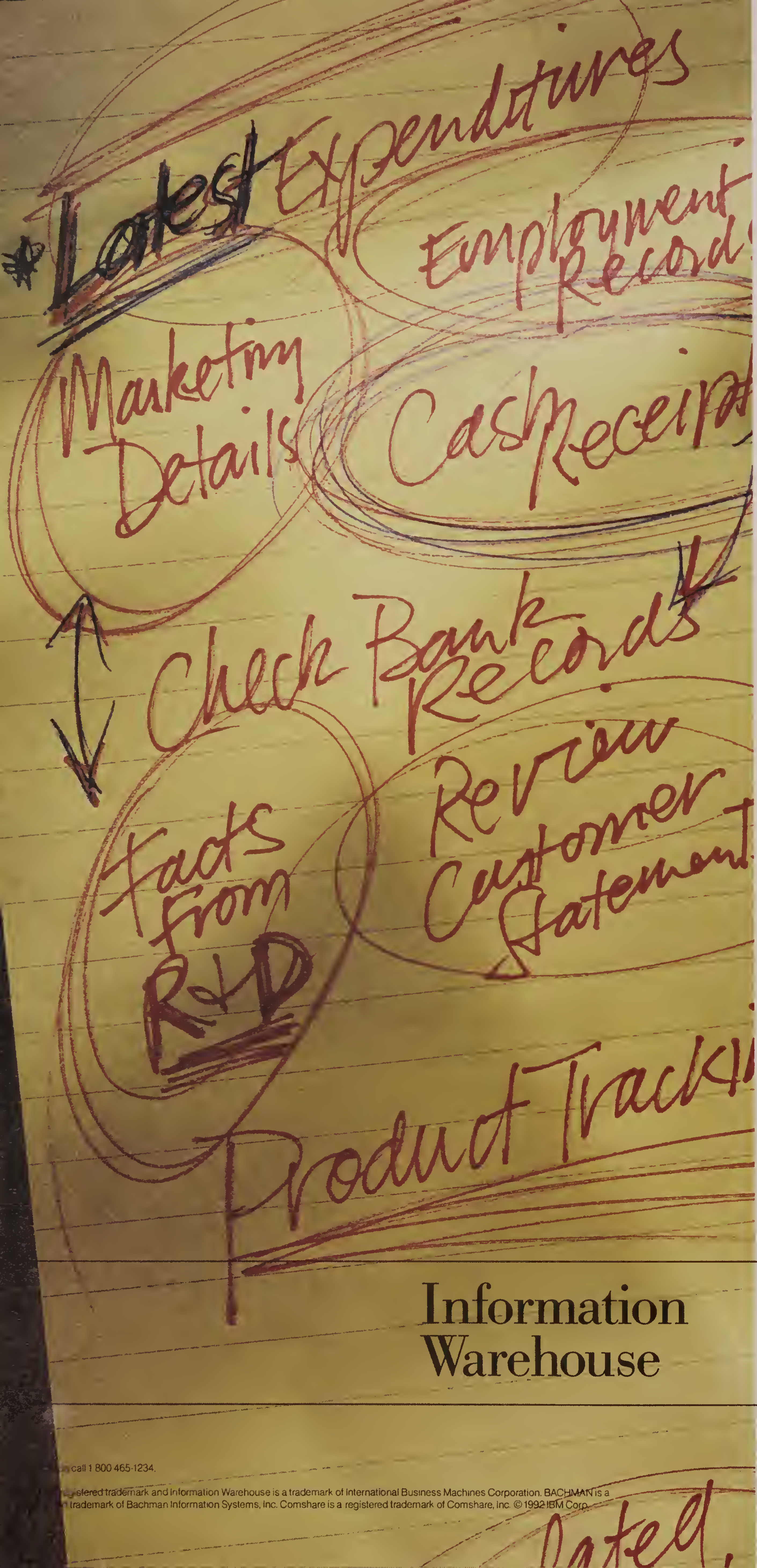
OSINET will have Electronic Document Interchange (EDI), just one of the OSI-driven wide area applications, on display to demonstrate the productivity benefits of Open Systems Interconnect solutions.

Netware Users International (NUI), one of largest computer user organizations in the world, will conduct a number of educational programs on the LAN implications of WAN strategies.

SCHEDULE OF EVENTS

EXHIBIT HALL AND LIVENET		
Tuesday	February 2	10:00 a.m. - 5:30 p.m.
Wednesday	February 3	10:00 a.m. - 5:30 p.m.
Thursday	February 4	10:00 a.m. - 4:00 p.m.
TUTORIALS *(including LiveNet Tech)*		
Monday	February 1	9:00 a.m. - 5:00 p.m.
Tuesday	February 2	9:00 a.m. - 5:00 p.m.
HANDS-ON WORKSHOPS		
Tuesday	February 2	9:00 a.m. - 5:00 p.m.
EXECUTIVE SYMPOSIUM		
Monday	February 1	9:00 a.m. - 5:15 p.m.
Tuesday	February 2	9:00 a.m. - 1:45 p.m.
CONFERENCE SESSIONS		
Wednesday	February 3	8:00 a.m. - 6:00 p.m.
Thursday	February 4	8:00 a.m. - 4:30 p.m.
LIVENET TECH CONFERENCE SESSIONS		
Wednesday	February 3	9:00 a.m. - 4:30 p.m.
Thursday	February 4	9:00 a.m. - 4:30 p.m.

ComNet is produced by World Expo Corp. and sponsored by *Network World*. LiveNet is sponsored by *Computerworld*. World Expo Corp., Network World Inc., and *Computerworld* are all companies of International Data Group, the leading global provider of information services on information technology.



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YOUR FREE TICKET TO OVER 450 COMNET EXHIBITS AND A WHOLE LOT MORE!

Take advantage of our special FREE offer. Plan now to attend ComNet '93, February 1-4 in Washington, D.C.

MEET OVER 450 LEADING MANUFACTURERS AND SUPPLIERS showcasing the latest products and services for multivendor connectivity, public networking, internetworking and network computing.

Benefit from all of these opportunities that are FREE with the ticket below.

SEE MORE THAN 200 NEW PRODUCTS—many of our exhibitors are taking part in the New Product Program. Their booths will be marked with colorful ribbons, and there will be a special section in the showguide (including a new product floor plan) that describes and helps you locate the hottest offerings.

CAST YOUR VOTE FOR THE BEST NEW PRODUCT of the year when you participate in the 2nd Annual New Product Achievement Awards Competition. Choose from 10 semi-finalists' products as determined by a panel of distinguished judges who have been carefully selected from various business publications, trade journals, research firms, and academic arenas.

NETWORK WORLD 500

Hear the results of the *Network World 500*, a research study conducted jointly by International Data Corp. (IDC), *Network World* and World Expo Corp., producers of ComNet, that focuses on the strategic issues facing large enterprise network users in the 90s. The findings of interviews with 500 network professionals—*Network World* readers—will be presented by Kim Myhre of IDC at a special Celebrity Speaker session, *Managing Enterprise Network Investments In The 90s*, on Tuesday, February 2 at 4:00 p.m. Open to all attendees.

WITNESS THE INTRODUCTION OF LIVENET—the industry's first demonstration of high-performance enterprise networking where you'll see real-world applications up and running. LiveNet is an all-new show-within-a-show, complete with its own exhibit hall and conference. It's your opportunity to see exciting new technologies like Fiber Channel, FDDI, HIPPI, ATM and much more. *(See inside back cover for details.)*

COMNET'93
CONFERENCE AND EXPOSITION
February 1-4, 1993 • Washington, D.C.
Washington Convention Center
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Grand Hyatt

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ComNet is sponsored by
NETWORK WORLD
The Newsweekly of Enterprise Network Strategies

LIVENET
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COMPUTERWORLD

VIEW SPECIAL SHOW-FLOOR DEMONSTRATIONS from the Open Software Foundation (OSF), OSINET, the Network Management Forum, and NetWare Users International (NUI) and learn about the technologies that will bring you increased productivity and profitability in the year ahead. *(See inside back cover for details.)*

MEET WITH YOUR FAVORITE VENDORS at our all-new Exhibitor Seminars where you can discuss product benefits and get answers to your specific technical questions. There will be a complete description of over 15 different vendor presentations in the showguide.

SAMPLE THE COMNET CONFERENCE at any one of 19 Early Bird Sessions. Present your business card and your Exhibits Pass for admission. Sessions start at 8:00 a.m. on Wednesday and Thursday and are available on a first-come, first-served basis. *(Turn the page for a listing of specific topics.)*

ATTEND OUR KEYNOTES AND SPECIAL CELEBRITY SPEAKER SESSIONS and discover where our industry is headed. *(Turn the page for details.)*

Turn the page to see all the things you can do at the ComNet conference with your **FREE** ticket! See inside back cover for a complete exhibitor list, LiveNet and showcase demo descriptions, and schedule of events.

To register for the conference call 1-800-982-8188.

For more information about the exhibits call 1-800-225-4698.

ADMIT ONE FREE

EXHIBIT HALL ADMISSION ~~$50~~ **FREE** **GOOD FOR ALL 3 DAYS**

COMNET'93
FEBRUARY 1-4, 1993 • WASHINGTON, D.C.
Washington Convention Center
900 Ninth Street, N.W.
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Exhibit Hall Hours

Tuesday	February 2	10:00 a.m.-5:30 p.m.
Wednesday	February 3	10:00 a.m.-5:30 p.m.
Thursday	February 4	10:00 a.m.-4:00 p.m.

BRING TO SHOW—FREE ADMISSION TICKET

ADMIT ONE FREE

Get There First at the ComNet '93 Conference!

The ComNet '93 Conference is divided into five distinct parts. Each follows a specialized course of study that reflects this year's overall theme: "Enterprise Networks in Transition: New Applications and Corporate Profitability." In a year when knowledge and insights into change are more crucial than ever, you get five distinct ways of arriving at the big picture:

EXECUTIVE SYMPOSIUM—focus on the re-engineering of the corporate enterprise network in a time of rapidly advancing technology. For senior-level managers.

IN-DEPTH TUTORIALS—get thorough coverage of the latest networking trends and technologies in these intensive one- and two-day programs.

HANDS-ON WORKSHOPS—get one-on-one instruction and real-time experience in videoconferencing and worldwide product/type approval.

LIVENET TECH—take part in highly technical tutorials and conference sessions that focus on advanced networking technologies, including FDDI, ATM, Fiber Channel, HIPPI and more.

CONFERENCE SESSIONS—examine the broadest possible range of networking and communications topics organized into 10 focused tracks. Choose from over 65 individual sessions.

TO RECEIVE INFORMATION VIA FAX, PLEASE CALL 800-486-9808 (U.S. ONLY) OR 508-820-0633.

Dial the following extensions depending on your area of interest:

Tutorials *(including LiveNet Tech)*	x510
Executive Symposium	x511
Keynotes/Celebrity Speakers	x512
Workshops	x513
Conference Sessions *(including LiveNet Tech)*	x514

SAMPLE THE COMNET '93 CONFERENCE

Your Exhibit Hall Admission Ticket lets you try out the ComNet conference for FREE!

TWO KEYNOTE ADDRESSES

VICTOR A. PELSON
President and Group Executive, Communications Services, AT&T
Wednesday, February 3, 9:30 a.m.-10:30 a.m.

The Next Challenge: Democratizing and Globalizing 21st Century Communications

Learn how AT&T envisions tackling the task of providing easy access to voice and information communication in any form—anytime, anywhere.

DR. ROBERT METCALFE
Inventor of Ethernet and Publisher of *InfoWorld*
Thursday, February 4, 9:30 a.m.-10:30 a.m.

Where LANs Are Going On Ethernet's 20th Anniversary

Listen to what the inventor of Ethernet thinks about the PC LAN revolution and what it will teach us about the trend towards internetworked client-server systems.

CELEBRITY SPEAKER SERIES

KIM MYHRE
Senior Vice President, International Data Corporation (IDC)
Tuesday, February 2, 4:00 p.m.- 4:45 p.m.

Managing Enterprise Network Investments In The 90s

Hear the results of the ground-breaking study—the *Network World* 500 Survey. Examine how the leading networking companies of the 90s and their executives are making the critical leap to enterprise networks.

DAVID TORY
President and CEO, Open Software Foundation (OSF)
Wednesday, February 3, 12:15 p.m.-1:00 p.m.

Making Distributed Processing Happen (Finally)

Find out how OSF is meeting the challenge of Distributed Computing and Management Environments (DCE and DME) with vision and commitment. Examine the promise and shortfalls of distributed processing as it was envisioned in the 80s.

KEITH WILLETTS
Chairman of the Board, Network Management Forum
Wednesday, February 3, 1:00 p.m.-1:30 p.m.

Re-engineering Networked Systems Management

Get an overview of OMNI*Point* and see how it is helping network and systems managers to deliver better services at a lower cost.

DR. THEODORE IRMER
Director of CCITT
Thursday, February 4, 12:15 p.m.-1:00 p.m.

Nonstandard Environment of Standards

Hear how Dr. Irmer views the future of global networking and learn about CCITT's evolving role in the trend toward privitization and deregulation.

HOWARD ANDERSON
President, Yankee Group
Wednesday, February 3, 10:45 a.m.-12:00 p.m.

Hot Networking Technologies for the Venture Capitalist in 1993

Discover what makes a networking company hot and what will attract strategic investors in the 90s.

TOWN MEETING

RICHARD E. WILEY (Town Meeting Moderator)
Partner, Wiley, Rein & Fielding
Wednesday, February 3, 3:00 p.m.- 4:30 p.m.

Telco Entry Into Cable, Information Services and Manufacturing

A lively presentation is guaranteed from this panel discussion on how the RBOCs plan to enter into competitive businesses.

EARLY BIRD CONFERENCE SESSIONS

Present your business card and your Exhibits Pass for complimentary admission to any one of these sessions. Availability is on a first-come, first-served basis only. All ComNet sessions begin at 8:00 a.m. All LiveNet sessions begin at 9:00 a.m.

Wednesday, February 3
Building the Enterprise Network
Evolution of Networking Protocols to Open Systems
FDDI Product Analysis
Please Explain Multimedia Integration
Carrier Provided Frame Relay Offerings
Please Explain Network Management
Global Broadband Evolution
Advanced Network Technology Update
Network Outsourcing: How Much or How Little?

Thursday, February 4
Broadband Networking Concepts: Enterprise Networks
TCP/IP in Multivendor Environments
Video to the Desktop
Expert Systems: Network Management Intelligence in a Box
Service Quality and Reliability
Wireless Technology
Industry Consolidation: User Survival Strategies
End User Communications in Eastern Europe and CIS

LIVENET EARLY BIRD CONFERENCE SESSIONS

Wednesday, February 3
FDDI and ATM: Are These Technologies Competitive or Complementary? Panel Discussion

Thursday, February 4
Multimedia Network Alternatives, Panel Discussion

LIVENET

WRD

SECTIONS A-E MUST BE COMPLETE TO PROCESS YOUR REGISTRATION.

A. Please type or print clearly.

NAME ____________________ **TITLE** ____________________
COMPANY ____________________
ADDRESS ____________________
CITY ____________________ **STATE** __________ **ZIP** __________
PHONE ____________________

B. INDUSTRY (CIRCLE ONE)
1. Manufacturers *(other than computer/ communications)*
2. Finance/Banking
3. Insurance
4. Real Estate
5. Healthcare Services
6. Legal
7. Hospitality
8. Retail/Wholesale Trade
9. Transportation
10. Utilities
11. Education
12. Process Industries *(Mining/Construction/Petroleum Refining/Agriculture/Forestry)*
13. Government State/Local
14. Government Federal
15. Military
16. Aerospace
17. Consultant *(Independent)*
18. Carriers
19. Interconnects
20. Manufacturers *(Computer/ Communications)*
21. VAR/VAD/Systems House
22. Distributor, Computer Related
23. Distributor, Communication Related
24. Other *(Specify)* ____________

C. WHAT IS YOUR JOB FUNCTION (CIRCLE ONE)

Networking Management
1. Overall LAN/WAN Comm. Mgmt.
2. LAN Mgmt.
3. WAN/Datacom/Telecom Mgmt.
4. Operations Mgmt.
5. Technical Network Mgmt.

MIS Management
6. MIS, IS, IT Mgmt.
7. System
8. Applications/End User Comp. Mgmt.

Corporate Management
9. Corporate Mgmt. *(CEO, CIO Pres., V.P., Dir., Mgr., Financial Mgmt.)*
10. Consultant *(Independent)*
11. Other *(Specify)* ____________

D. NUMBER OF EMPLOYEES (CIRCLE ONE)
1. Under 100
2. 100-499
3. 500-999
4. 1,000-4,999
5. Over 5,000

E. WHAT IS YOUR ROLE IN THE PURCHASING PROCESS OF COMMUNICATIONS EQUIPMENT AND SERVICES? (CIRCLE ONE)
1. Final Decision Maker
2. Recommend
3. Specify
4. No role